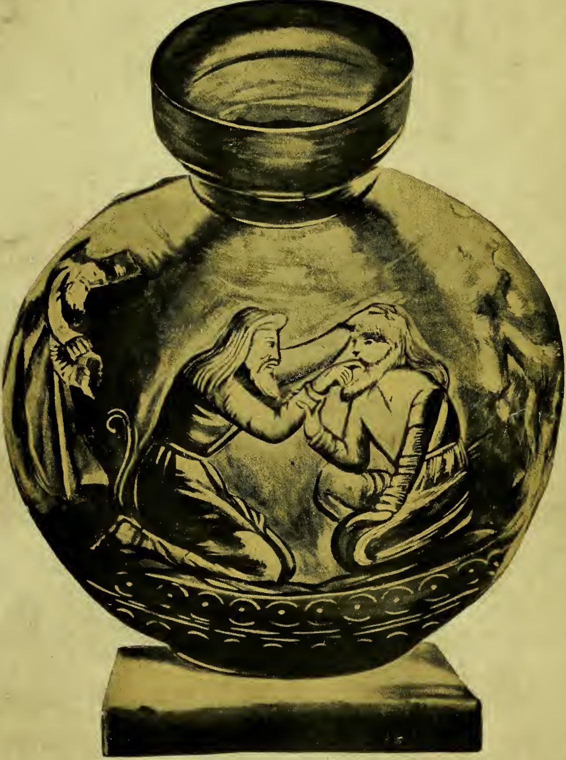
THE
DENTAL ART IN ANCIENT TIMES



Phœnician Vase showing an "Extraction"

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SIXTH INTERNATIONAL DENTAL
S, LONDON (ENG.)
UST 3-8, 1914

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An Ancient Egyptian Amulet

Worn to ward off toothache

22501686299

St. Appolonia

Patron Saint of Dentistry

St. Appolonia was born in Alexandria, and lived in the third century. As a Christian she was tortured by having her teeth broken and extracted, after which she was burnt at the stake. When under torture she is said to have prayed that those who remembered the day of her martyrdom, and in their prayers realised the pain she suffered, might never have toothache or headache.

From a MS. of the XV Century

THE
DENTAL ART IN ANCIENT TIMES

SOUVENIR OF THE

SIXTH INTERNATIONAL DENTAL CONGRESS

LONDON (ENG.), AUGUST 3-8, 1914

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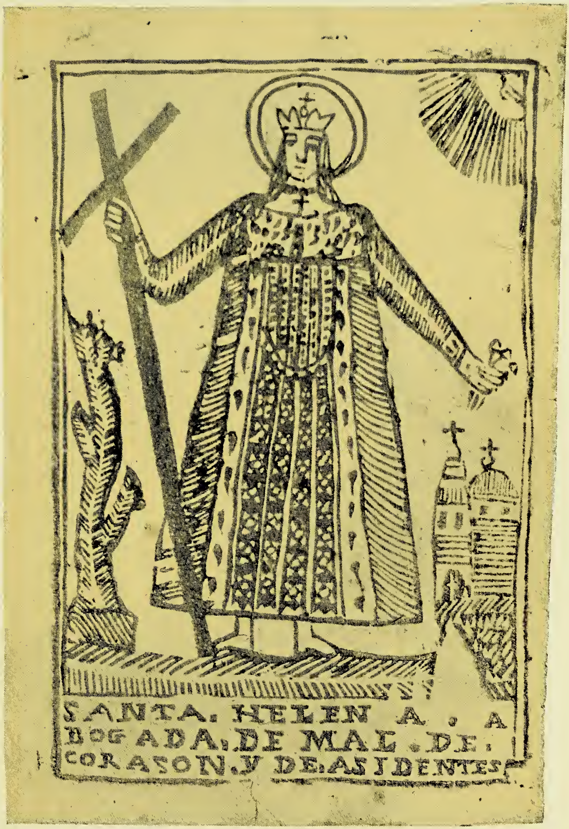
The Head-pieces, Tail-pieces, etc., in this book are taken from decorations on vases, etc., of the Etruscan period

Acknowledgment is made to the National Dental Association of the U.S.A. for the illustrations reproduced on pages 10, 11, 29, and facing pages 20, 21, 24, 25 (Figs. 1 and 2) and from "A History of Dentistry," by Vicenzo Guerini, published by Lea & Febiger, Philadelphia and New York, 1909

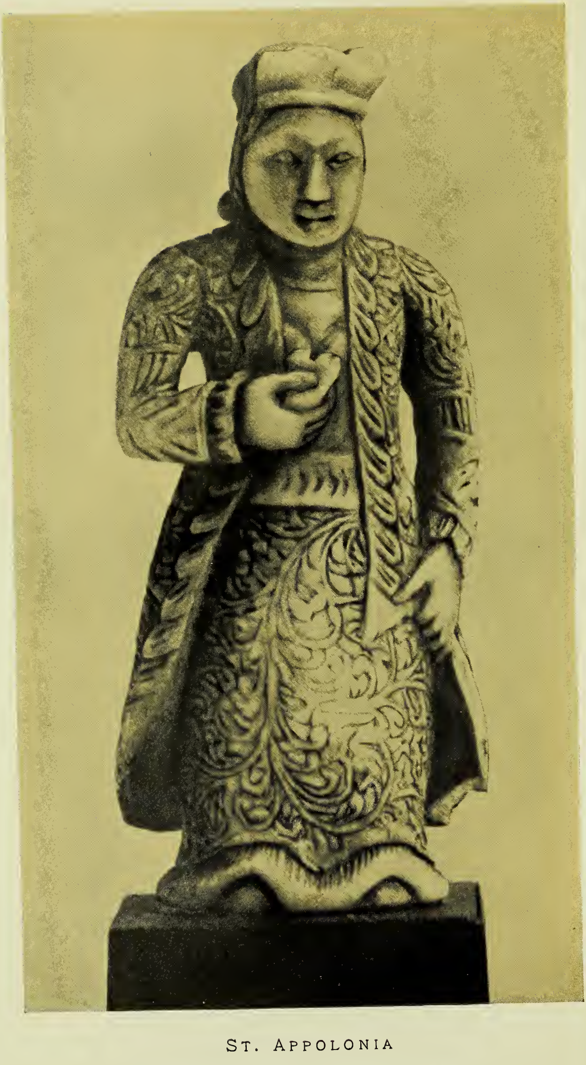


Saint Helena

ca. A.D. 640

Who was invoked for Heart and Dental Troubles.

From an early woodcut



ST. APPOLONIA
PATRON SAINT OF DENTISTRY

From an ivory carved figure of the XVI century

THE DENTAL ART IN ANCIENT TIMES

CHAPTER I

PREHISTORIC AND PRIMITIVE DENTISTRY

The origin of what may be termed the dental art, is practically coeval with that of medicine. In its early days dentistry, as practised by the primitive medicine man, was probably purely curative in character and was devoted to the alleviation of pain by remedial methods, or by means of charms and incantations. There is little doubt that, even in the most remote times, man suffered from dental caries and its attendant pain. In proof of this, prehistoric skulls which have been excavated in different parts of the world show traces of dental diseases, and sometimes show cavities formed by abscesses at the roots of the teeth. It would seem, however, that the teeth generally, in prehistoric and primitive times, were retained in sound condition to a much later period in life than they are at the present day.

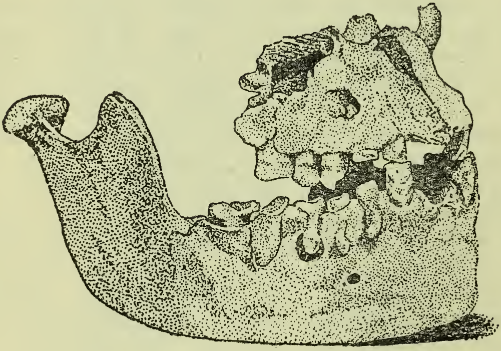
Its earliest day

In prehistoric man, it is the dental system which is the most characteristic sign pertaining to humanity. According to Saffre, the teeth found in various prehistoric skulls resemble each other, and are similar to those in the permanent denture of the large monkey, with the exception of the canine and the first pre-molar teeth, which differ in man and the monkey. Whilst the shape of the teeth is identical, their size and other characteristics are generally sufficient to distinguish the difference between man and the

Characteristics of the teeth of man and the monkey

monkey. The characteristics of the human teeth are typical, and it is hardly possible to mistake them for those of the monkey, still less of another animal, especially when the tooth or teeth are found on the maxillary bone.

The teeth found in the jaws of prehistoric skeletons do not often show signs of caries, and those that do belonged apparently to men well advanced in years. On the other hand, abrasion from use, or mechanical scars, are frequent. On examination of one hundred incisors or molars, Saffre found not less than seventy affected in this way.



A MAXILLA AND MANDIBLE SHOWING ABSCESS CAVITIES AT THE ROOTS OF THE TEETH

From a specimen excavated by Mr. Henry S. Wellcome in a prehistoric Ethiopian cemetery at Gebel Moya, A. E. Sudan, Africa

"There is," says Baudoin, "a sort of balancing between wear and caries. The signs of wear are no doubt due to the nature of the food, which was often devoured either raw or very little cooked, and was exceedingly difficult to masticate. Our ancestors in the Stone Age certainly needed good teeth in order

PRECOLUMBIAN DECORATED TEETH

The following illustrations, for which we are kindly indebted to Professor Marshall H. Saville, show skulls containing teeth inserted with gold, and methods of inlaying and decorating the teeth which were discovered by him and by others recently in Ecuador.

In his investigations, Professor Saville has found that the custom of decorating the teeth was common not only in Esmeraldas, Ecuador, but also in various parts of Mexico. In Oaxaca, he found that hæmatite was used: in Vera Cruz, turquoise; and. in other parts, teeth were found set with rock crystal. Teeth decorated with obsidian and red cement have also been discovered.

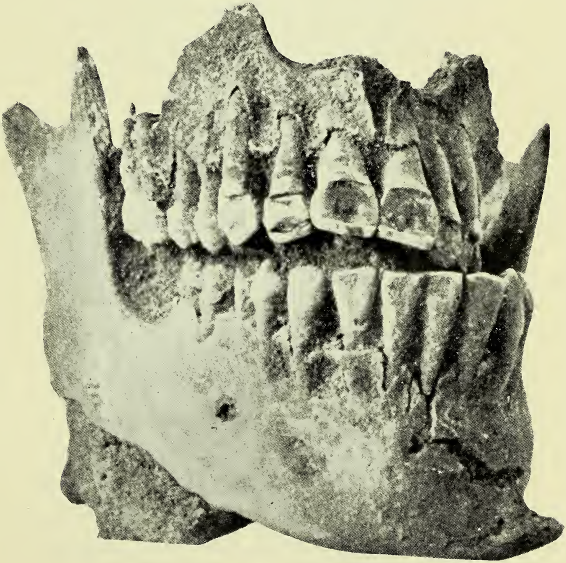


Fig. 1. SKULL, WITH TEETH OVERLAID WITH GOLD

From La Piedra, Esmeraldas, Ecuador

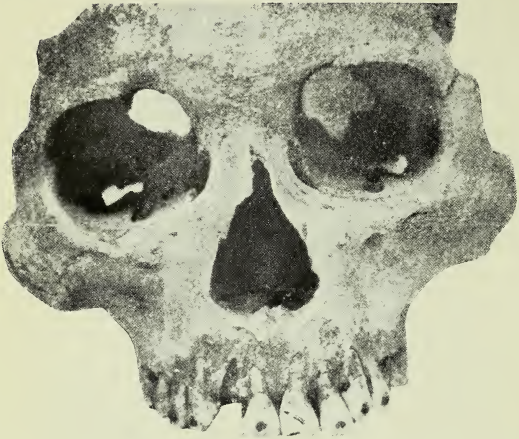


Fig. 2. SKULL, WITH TEETH INLAID WITH GOLD

From Atacames, Esmeraldas, Ecuador

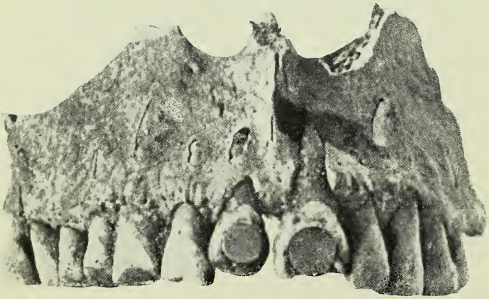


Fig. 3 SKULL, WITH TEETH DECORATED BY INSERTION OF THIN GOLD DISCS

From Atacames, Esmeraldas, Ecuador

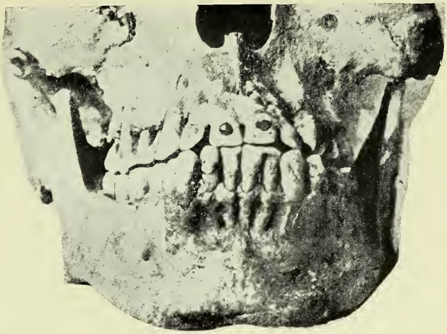


Fig. 4. SKULL, WITH TEETH INLAID WITH JADEITE
From Chalchicomula, Puebla, Mexico

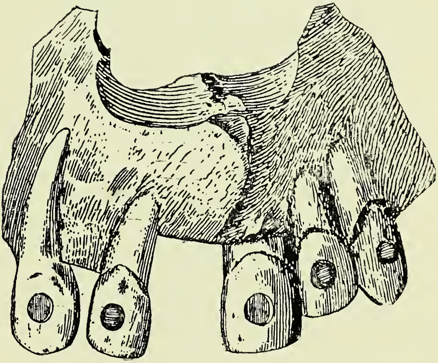
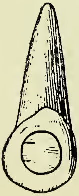


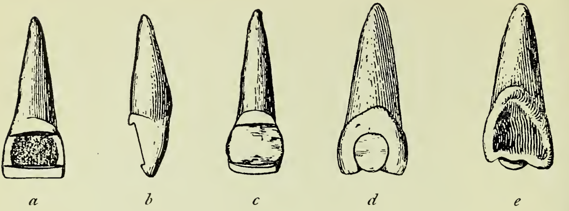
Fig. 5. UPPER TEETH INLAID WITH TURQUOISE
From Campeche, Mexico

Fig. 6. A TOOTH DECORATED WITH GOLD



Found implanted in a jaw to replace the middle incisor. Professor Saville considers this unusual dental feat to be a "genuine precolumbian triumph of the ancient dentists of Atacames." In connection with this, Andrews, who discovered a lower jaw at Capan, in 1892, found that a lower left lateral incisor had been carved from some dark stone and had been implanted to take the place of one that had been lost. From the accumulation of tartar, it would appear to have been worn for some time during life. It was found neatly fitted into the socket and is shaped very much like a natural tooth.

PRECOLUMBIAN DECORATED TEETH—*continued*



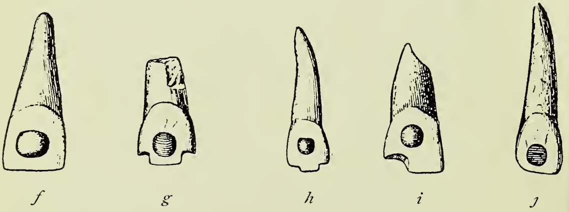
(a) Tooth from skull found at La Piedra. Esmeraldas (*see* Fig. 1). The gold overlay has been lost. This is a front view.

(b) Side view of *(a)* showing that cutting extends towards dentine 1 mm. or more.

(c) Another tooth from same skull, showing the overlay of gold which covers the outer face of the tooth almost entirely.

(d) Tooth from skull found at Atacames, Esmeraldas (*see* Fig. 3). This is decorated by the insertion of a thin gold disc fixed in a cavity drilled or bored in the enamel of face of tooth.

(e) Back view of *(d)* showing edge of gold disc projecting. The appearance of the tooth suggests filing before insertion of the inlay.



(f) An upper incisor found in Yucatan. It carries an inlay of turquoise but is not filed. Near the upper end of the tooth is a perforation for suspension.

(g) A tooth from Tecolpa, Chiapas, inlaid with jadeite and filed at each corner.

(h) An upper incisor from the ruins of Copan. Honduras. It is decorated with an inlay of jadeite and is filed.

(i) A tooth from Copan, Honduras. Inlaid with jadeite but filed only on the right corner.

(j) An upper canine found at Xoxo, Oaxaca, inlaid with hæmatite but not filed.

to subsist at all, and those who were not in a state to masticate probably often died from this cause."

Caries in the Neolithic period

During the Neolithic period, it was only the fittest who survived. There is ample evidence, as already stated, that prehistoric man suffered from dental caries, and his first instinct apparently was to relieve the resulting pain. To obtain this relief he may have practised extraction by means of the finger and thumb, the natural forceps of primitive man; an alternate step would be to seek the aid of some herb possessing the property of soothing the pain. He no doubt soon discovered that the application of cold or hot water would give relief. He may even have filled up the holes, which the caries produced, with the shavings of horn or powdered flint in the hope of stopping the process of decay.

Remedies of primitive man for tooth-ache

There is some evidence that even dental prosthesis was not unknown in very early times, and Professor Marshall Saville, of Columbia University, is said to have excavated in the Province of Esmeraldas in North Ecuador, South America, a number of skulls of a pre-Incan tribe of South American Indians which are stated to exhibit dentistry in a high stage of development *(see illustrations in the four pages immediately preceding this).* "The skulls showed that the men were of a type superior to the Aztecs. Besides the better shape of the skull, the teeth were often filled with gold and cement, proving that dentistry was at a high stage of development among the early residents in Ecuador thousands of years ago." In Mexico, human teeth that were filled and ornamented with stone have been dug up, but Professor Marshall Saville's "find" is said to be the first instance of gold-filling having been found in a prehistoric skull. In all cases, whether the fillings were gold or cement, the borings indicated the use of a tool. Several teeth intertwined with

Prehistoric dentistry in South America

gold wire were found in a skull discovered by Garcia in 1836.

Babylonian treatment for tooth-ache

Probably the earliest method of treatment for tooth-ache of which we have record is that practised by the ancient Babylonians, who believed that caries was caused by the gnawing of small worms at the tooth; a belief which has survived in out-of-the-way places to the present day. To exorcise these insect marauders, the Babylonians recited the following incantation over the sufferer:—

"After Anu (had created the heavens)
The Heavens created (the Earth)
The Earth created the Rivers
The Rivers created the Canals
The Canals created the Marshes
The Marshes created the Worm
Came the Worm and wept before Shamask
Before Ea came her tears—
What wilt thou give me for my food
What wilt thou give me to devour?
I will give thee dried bone,
And scented . . . . (wood)
Let me drink among the teeth
And set me on the gums,
That I may devour the blood of the teeth
And of their gums destroy their strength
Then shall I hold the bolt of the door."

After chanting this three times, the patient was directed to rub the gums with a mixture of beer, a certain herb and a pungent oil, the names of which cannot at present be identified.

It is owing to the ancient belief that caries was caused by small worms which devoured the teeth, that probably led to the application of crushed henbane seeds to the decayed tooth when painful, a remedy which is widespread and which is still used in many parts of Europe and Asia Minor.

CHAPTER II

The Dental Art in Ancient Egypt

Our knowledge of the dental art in ancient Egypt is derived largely from the Papyrus Ebers which was discovered in 1873, and was written probably about the year 1550 B.C., although there is little doubt that many of the recipes which it contains date back to a much earlier period. The references to dental ailments in the Papyrus are numerous, and include inflammation of the gums and tooth-ache.

Papyrus Ebers

One of the most popular early Egyptian methods of treatment for tooth-ache consisted in filling up the cavity of the decayed tooth with powdered incense or crushed henbane seeds mixed with cement. In most cases it is directed that the application of the remedy is to be accompanied by certain incantations, to be repeated three times.

For tightening loose teeth a mixture of powdered palm fruit, coarse plumbago and honey is recommended. By rubbing this mixture on the gums vigorously, the desired effect is said to be produced. For inflamed gums or bleeding, a plaster of goose-grease and honey is advised.

Although extraction is not mentioned throughout the Papyrus, there is evidence from other sources that the Egyptians knew how to extract teeth, and that it was resorted to as a punishment or method of torture.

Extraction

The various references to dental diseases in the Papyrus, and the treatment prescribed, throw an interesting light on the medicine of the period. Thus, to ease the throbbing pain of the "Bennut Blister" in the teeth, which was probably a small abscess, the following recipe is recommended:—

Dental remedies

Sep grains	1 part
Dough	1 ,,
Honey	1 ,,
Oil	1 ,,

To be applied to the part as a plaster

A second recipe for the same complaint, which appears to have been a common one among the ancient Egyptians, is as follows:—

Cow's milk . . .	1 part
Fresh dates . . .	1 ,,
Uah corn	1 ,,

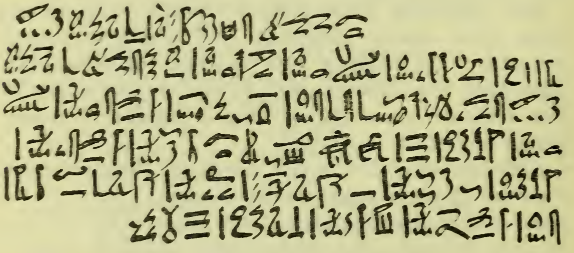
This is to be left to stand and then masticated nine times

Another remedy prescribed to strengthen the teeth is as follows:—

Powder of flint stones .	1 part
Green lead . . .	1 ,,
Honey	1 ,,

This is to be rubbed on the teeth

The word *Uxedu* occurs more than thirty-five times in the Papyrus Ebers, and probably means a painful swelling. It is referred to in connection with the mouth in a recipe recommended to "cure the growth of *Uxedu* in the teeth," which was probably an alveolar abscess, accompanied by swelling of the surrounding parts. The recipe reads as follows:—



Three Dental Recipes from the Papyrus Ebers

Dough	1 part
Beans	1 ,,
Honey	1 ,,
Verdigris	1 ,,
Green lead	1 ,,

To be powdered, mixed, and applied to the teeth

"The gnawing of the blood in the teeth"

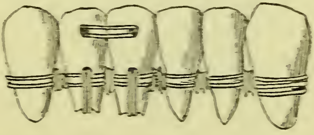
In addition to these examples, many recipes are recorded for "strengthening the teeth," also chewing remedies for stopping the tooth-ache and for curing "the gnawing of the blood in the teeth," which probably refers to the pain caused by caries and pulpitis. From the recipes given, some idea may be gathered of the methods used by the Egyptians for alleviating dental troubles 5000 years ago.

Although no mention is made in the Papyrus of any dental operation, Herodotus, who visited Egypt about 450 B.C., states that the Egyptians had specialists who treated most diseases, and among others there were those who attended to the teeth.

About this period it seems probable that the Egyptians knew something of dental prosthesis, and even that the Egyptian dentist employed gold for the purpose of stopping. Wilkinson remarks that he had seen teeth of Egyptian mummies stopped with gold, but existing specimens are not known.

An Egyptian artificial denture

The earliest artificial denture, probably of Egyptian origin, is that discovered by Gaillardot and described by Rénan in his "Mission de Phenicie," which was in the ancient Necropolis of Saida, or Saidon. In excavating a grave in one of the oldest parts of the Necropolis, Gaillardot found a quantity of small objects consisting of a part of the upper jaw of a woman with the two canines and the four incisors joined together with gold wire. Two of the incisors would appear to have belonged to another individual, and to have been applied as substitutes for lost teeth.

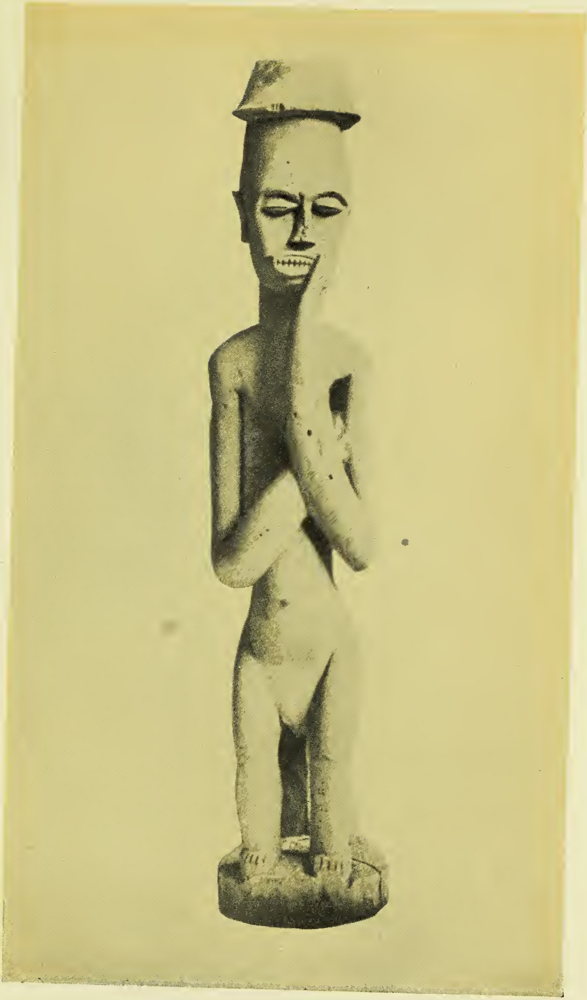


Artificial Teeth, probably Egyptian, excavated at Saidon

That this contrivance was Egyptian work is probable from the fact that among the small objects found with it were two copper coins, an Egyptian scarab and twelve small statuettes of faience representing Egyptian deities, which are believed to have formed part of a necklace. It is evident that these artificial teeth could not have been used for the purpose of masticating, but were inserted presumably as ornaments to fill the gaps left by natural teeth that had been lost.

Dentistry among the early Hebrews

Although in the Old Testament a great many allusions are made to the teeth, there is no definite reference in early Hebrew literature to dentistry. In the "Songs of Solomon" reference is made to the beauty and whiteness of the teeth in the following words: "Thy teeth are like a flock of sheep that are even shorn, which came up from the washing;" and, in a later passage, a variation of these words occurs. Broken or decayed teeth are referred to as symbolic of weakness. Thus confidence in an unfaithful man in time of trouble is, says the Wise Man, "like a broken tooth"; and the sensation produced on the teeth by acids is referred to in the Book of Jeremiah in the passage "the fathers have eaten a sour grape, and the children's teeth are set on edge."



FETISH FIGURE REPRESENTING TOOTHACHE
(CARVED IN WOOD)

From the Ijok Country near the Niger

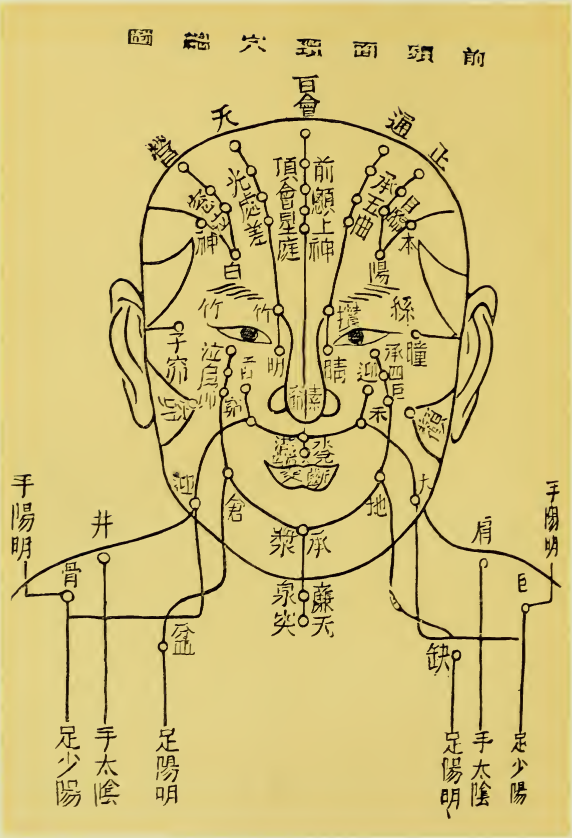


DIAGRAM SHOWING PARTS OF THE HEAD TO BE TREATED BY ACUPUNCTURE FOR TOOTHACHE AND PAINS IN THE FACE

From a native Chinese work on Acupuncture

CHAPTER III

ANCIENT CHINESE AND JAPANESE DENTISTRY

Early Chinese records of "Ya-tang" or tooth-ache

In the early Chinese literature and records, frequent mention is made of dental diseases. Tooth-ache, which is called *ya-tang*, appears to have been as common as it is to-day, and in some of the early Chinese works on medicine the distressing ailment is described with great minuteness.

Fong-je-tong.—Is caused by sudden cold.

Fong-lan-tong.—Is also caused by cold. The pain is very great, but the gums are neither red nor swollen.

Ye-tong.—Is also produced by chill. The gums are red and swollen; there is no discharge of mucus; great pain, which is aggravated by cold liquids.

Han-tong.—This is also due to cold. Pains in the cheek and forehead proceeding from the teeth; no diseased condition either of the gums or of the alveoli.

Tou-tan-tong.—Violent cough and tooth-ache at the same time; difficulty in masticating.

Yn-hiue-tong.—The gums are pale, or violet-red, hard and lumpy, sometimes bleeding; the tooth-ache is continuous. Among the numerous remedies recommended against this malady (mouth-washes, frictions, draughts, pills), one particularly deserves mention; it is the urine of a child used as a mouth-wash.

Tchong-che-tong.—Pain in the teeth after mastication; there is also sometimes excoriation of the gums; flow of purulent mucus mixed with blood; bad-smelling breath; the tooth falls; it is decayed, and one can perfectly well distinguish a small hole; the root is unsound; in extracting the tooth, one sometimes brings away together with it a little white worm, with a black spot on the head, which can be distinguished by the aid of a magnifying glass, A remedy must immediately be administered to destroy these worms, otherwise the patient runs the risk of having his other teeth attacked in the same manner, and of their falling out.

Remedies in the forms of draughts, mouth-washes and frictions are given for the tooth-ache caused by sudden cold. Among the Chinese records we again come across the ancient and universal tradition that "a little white worm was the cause of caries and tooth-ache." For its destruction the application of Arsenic and Houong-tan in equal parts is prescribed, powdered, mixed with water and formed into a small pill, and put close to the aching tooth. Then the patient is to be composed to sleep, and cure is said to be certain.

Swollen gums, abscesses and ulcerations are all noticed in turn. The remedies prescribed were mostly herbal, and included mint and rhubarb.

Acupuncture and cauterisation

Acupuncture, still a favourite form of treatment with native practitioners in China, was also used from early times to relieve tooth-ache. It consists in the insertion of needles into various parts of the body, twenty-six points of election being prescribed when this form of treatment is used for tooth-ache, and six other points for pains in the gums. The most favourable spots for inserting the needles are indicated with great precision in one record, and the depth to which the needles should penetrate is said to be an important point in the operation. The puncturing is generally associated with cauterisation, and after the withdrawal of the needle it is customary to apply the "moxa," which is made by taking a piece of vegetable wool and fashioning it into a cone. This is placed on a coin over the puncture and then lighted. The heat so caused is supposed to draw out the humours that cause the pain.

Tooth-ache pills in 2637 B.C.

In a work said to have been written by the Emperor Houang-Ty, one of the earliest exponents of Chinese medicine, who is supposed to have lived 2637 B.C., several allusions are made to diseases of the mouth. Among other remedies, pills made of powdered garlic are recommended to relieve tooth-ache, while among the curious animal substances employed, bats are prescribed to be taken as a preventive of caries, and the excrement of the bat in powder is recommended for use in whitening the teeth. A method of curing a simple fracture of the inferior maxillary bone is also described as follows: "With the hands one brings the two parts together, and applies an apparatus of small bamboos which is left in position until the cure is complete. At the same time, take a fowl which has been plucked, and from which the bones have been removed, add a few onions, then pulverise it and apply the powder to the affected parts." The cure is said to be certain in a fortnight for a child, and in a month for an adult. Houang-Ty also recommends a powder composed of musk and ginger to whiten the teeth.

Treatment of maxillary fracture

The methods and treatment adopted by the Japanese in ancient times for dealing with dental troubles, as might be expected, were very similar to those in use in China. The Japanese native dentist who travelled the country is said to have been very expert in extracting teeth, using his fingers only for this purpose without the help of any instrument. His method was to seize the head of the patient at the corner of the lower jaw in such a manner that the mouth was forced to remain open. Then, plunging the thumb and first finger of the other hand into the patient's mouth, he extracted as many teeth as he thought necessary. The method of training the dental operator in this form of extraction is somewhat interesting, and is said to have been carried out as follows: In a plank of soft wood a number of holes were made and into each hole a plug was forced. The plank was then placed on the ground, and the student was told to seize with the thumb and first finger of his right hand the plugs, and to pull them out without moving the plank. After this exercise had been practised several times, a harder wood was substituted and the exercise repeated, the plugs being fixed more tightly each time. When the student succeeded with the last test, he was said to be fit to pursue his calling.

Japanese dentistry

CHAPTER IV

THE DENTAL ART OF THE GREEKS

The high state of culture attained by the Greeks about 400 B.C., and the knowledge of the healing art they possessed, would naturally warrant the supposition that they had some knowledge of the diseases of the mouth and teeth. According to Cicero, "Extraction was first advised by the third Asklepios, son of Arsinoë and Arsippi, *ca.* 1300 B.C., and he also recommended the cleansing of the alveolar region."

A tradition of the origin of extraction

Whether this tradition is authentic or not it is impossible to say, but it is known that temples of healing dedicated to Asklepios were to be found in almost every Greek city of any size, and to them came the sick and diseased seeking relief from their sufferings, amongst which dental troubles may be presumed to have been included. Celius Aurelianus records that a leaden instrument used for the extraction of teeth was deposited in the temple of Apollo at Delphi. Whether this was simply a model placed there for anyone who wished to copy it in other metal, or kept there so that the physician might explain its use, is not known.

About six centuries before the Christian era, Solon (640–558 B.C.) noted that the milk teeth were replaced by permanent teeth about the age of seven years, and Democrates of Abdea alludes to the falling out of the teeth, and its cause.

A knowledge of two dentitions

As the Hippocratic period is approached, a gradual advance in medical knowledge may be noticed, and that the care of the mouth was regarded as important at this period may be judged from the works of the Father of Medicine (400 B.C.), in which will be found many allusions to dental troubles. For black and unhealthy gums, he recommends that a mixture of dill, aniseed and myrrh should be placed in pure white wine. This, it was directed, should be held in the mouth for some time and used also for rinsing the buccal cavity. It was advised that this should be done after each meal and when fasting.

Hippocrates on dental troubles

"In cases of tooth-ache," according to Hippocrates, "if the tooth be decayed and loose, it must be extracted. If it be neither decayed nor loose, but still painful, it is necessary to desiccate it by cauterising. Masticatories are also good, as the pain arises from *pituita* insinuating itself under the roots of the teeth. Teeth are eroded and become decayed partly by *pituita* and partly by food, when they are by nature weak and badly fixed in the gums."

Early Grecian dentifrice

The use of chalk or carbonate of lime as a dentifrice dates back to the time of Hippocrates. He mentions it as the basis for a dentifrice mixed with the head of a hare and the intestines of mice.

He refers to the use of instruments, in his work entitled "De Medico," where he mentions certain articles and instruments that should be kept in a doctor's room. "These are the instruments," he states, "necessary to the doctor's operating room, and in the handling of which the disciple should be exercised; as to the pincers for pulling out teeth, anyone can handle them, for evidently the manner in which they are to be used is simple."

Castorium and pepper for tooth-ache

Hippocrates, in his records of cases, mentions a mouth-wash composed of castorium and pepper, which was found efficacious in cases of tooth-ache. The passage reads: "In consequence of tooth-ache, the wife of Aspasius had her cheeks swollen, but in making use of mouth-wash of castorium and pepper she found great relief." Further, he records: "Melisandrus suffered severe pain and swelling in the gums; he was bled in the arm. Egyptian alum, if used in this malady, arrests its development."

Necrosis of the jaw

In another passage he refers to necrosis of the jaw in the following terms: "Cardias, the son of Metrodorus, by reason of pains in the teeth was subject to mortification of the jaw. Excrescences of a fleshy kind that grew most rapidly formed on the gums; the suppuration was moderate, the molars fell out, and afterwards the jaw itself."

Hippocrates also makes several allusions to fracture of the jaw, which was evidently not infrequent in his time.

Grecian bridge work

That some form of artificial appliance was known for replacing lost teeth is evident from the specimens of early Greek workmanship that have been used for this purpose, now in the Archæological Museum at Athens. One of these represents a form of bridge work composed of metal in which a tooth is inserted as shown in the illustration *(facing page 20)*, and the other consists of four teeth, probably for the lower jaw, held together by a piece of wire. It is interesting in connection with this to note that Hippocrates mentions, "in case of an incomplete fracture of the jaw, if the teeth in proximity of the lesion be shaken, one ought, after having reduced the fracture, to bind them one to the other until the consolidation of the bone, using preferably gold wire for the purpose, but, if this be wanting, linen thread can be used instead."

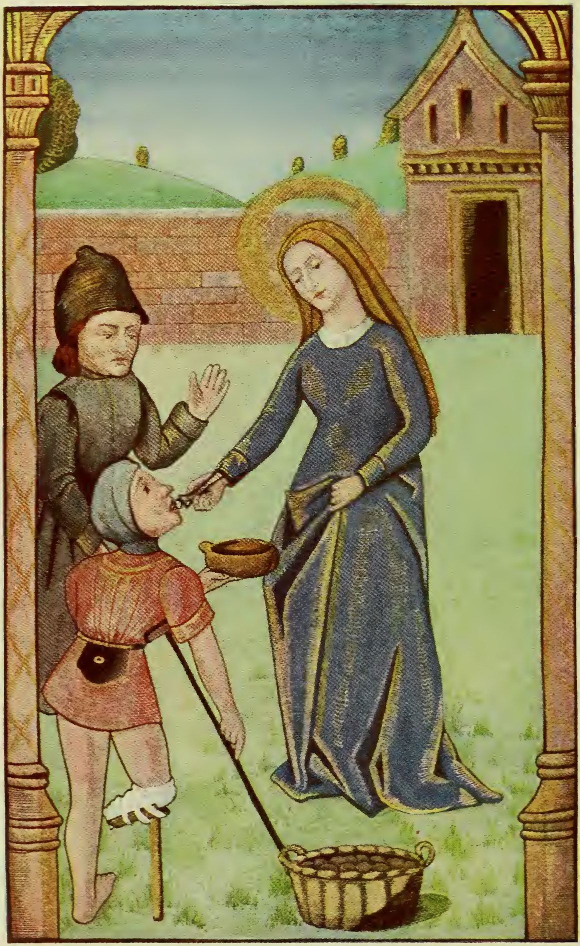
Dental forceps as an example in mechanics

Aristotle (384–322 B.C.) in his "Natural History and Comparative Anatomy," refers in a chapter on "the different parts of animals," to the study of the teeth. He compares the teeth of man with those of animals. In another book, devoted to mechanics, he refers to extraction in the following words: "Why do doctors extract teeth more easily by adding the weight of the *odontagra* (dental forceps) than by using the hand only? Can it be said that this occurs because the tooth escapes from the hand more easily

St. Appolonia

Patron Saint of Dentistry

From a MS. of the XV Century



St. Appolonia

Patron Saint of Dentistry

Extracting a tooth from a cripple

From a M S. of the XV Century

than from the forceps? Ought not the irons to slip off the tooth more easily than the fingers whose tips, being soft, can be applied around about the tooth much better? The dental forceps is formed by two levers acting in contrary sense and having a single fulcrum represented by the commissure of the instrument. By means of this double lever it is much easier to move the tooth, but, after having moved it, it is easier to extract it with the hand than with the instrument."

Diocles, a famous Greek physician who lived in the third century B.C., did not favour extraction, and strongly recommended a mixture composed of cedar gum and saffron to relieve the pain of an aching tooth.

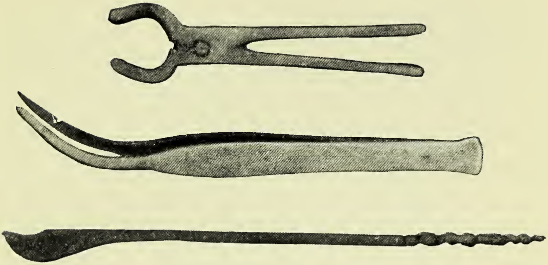
From Aristotle's time to that of Galen (A.D. *ca.* 200) the dental art appears to have made but little progress, but diseases of the teeth and their treatment no doubt occupied the attention of the more intelligent Greek physicians such as Herophilus and Erasistratus in the early centuries of the Christian era.

Dentistry advances under Galen

Judging from the works of Galen a distinct advance was made in the knowledge of dentistry in his time. He classifies the teeth as incisors, canines and maxillaries, and explains their uses. "Why have we exactly thirty-two teeth fixed," he asks, "sixteen to a row in each jaw, the front ones called incisors, sharp and large, capable of cutting in biting? After them come the canines, large at the base and sharp at the top, capable of crushing a substance too hard to be cut by the incisors. Then follow the maxillaries, also called molars, uneven, large, hard and long, to grind the food cut by the incisors and broken up by the canines." Galen recognised the nerves of the teeth and was the first to enunciate the theory that the pulp was the sensitive element of the tooth. He also noted irregularity of the teeth in some cases, and stated that cold is the enemy of the teeth. To relieve pain he recommended henbane, and, if the pain continues, "the tooth should be perforated with a small trepan and into the orifice appropriate remedies introduced by means of a director. If it is thought necessary to extract the tooth, powdered pellitory root mixed with strong vinegar should be applied after having protected all the other teeth by covering them with wax."

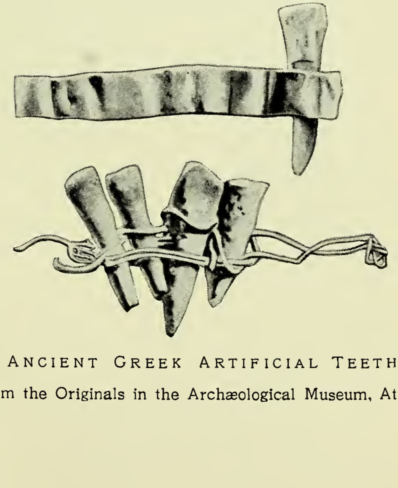
Many allusions to the teeth and diseases of the mouth are to be found also in the works of Oribasius (A.D. 325–400) and of Aetius (A.D. 517–565), who noted that the nerves passed into the teeth through the roots.

From this brief summary of the knowledge of the dental art in ancient Greece, it will be seen that the Greek physicians gave serious study to the subject, and they advanced some original ideas on the structure of the teeth and the diseases of the mouth.



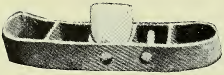
Ancient Greek Dental Instruments

From the Originals in the Archæological Museum, Athens



Ancient Greek Artificial Teeth

From the Originals in the Archæological Museum, Athens



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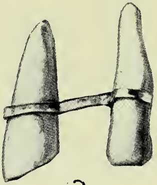

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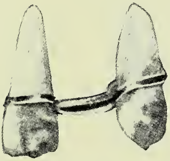

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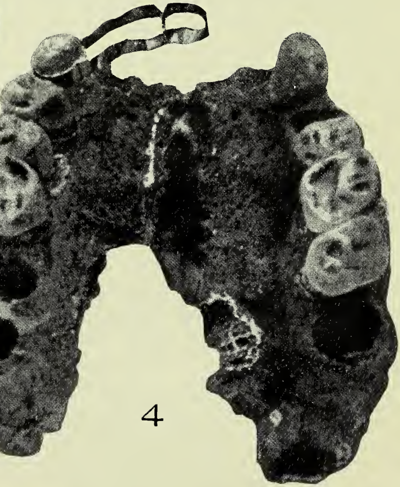

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1.—Ancient Etruscan Dental Appliance for two artificial teeth.

2.—Ancient Etruscan Dental Appliance.

3.—Ancient Etruscan artificial teeth.

4.—Ancient Etruscan Dental Appliance.

CHAPTER V

ETRUSCAN DENTISTRY

Among the Etruscans, the civilised community that flourished in mid Italy before the foundation of Rome, the dental art appears to have made considerable advancement, especially in prosthesis. Owing possibly to their natural intercourse and trade with the Egyptians and Phœnicians, they attained a high degree of civilisation and exhibited great skill in the decorative and other arts.

Notable advance in prosthesis

The various dental appliances found in the Etruscan tombs prove that dentistry among these people achieved a high position. In the Museum of Pope Julius in Rome there is a dental appliance which was excavated in a tomb at Civita Castellana, the ancient Falerii. This consists of a series of four gold rings meant apparently to encircle the canine, two bicuspids, and the first molar teeth. The third ring is crossed by a pivot riveted at the two extremities, which was designed presumably to hold fast an artificial tooth which is now missing. The whole appliance, as shown in the illustration opposite, is a beautiful specimen of mechanical art. Tooth crowns have also been found in an Etruscan tomb in the ancient Vitulonia, the enamel capsules being well preserved, although the ivory has entirely disappeared.

An early specimen of dental art

A still more interesting specimen of Etruscan dentistry is now in the Civic Museum of Corneto, the ancient Tarquinii. This is depicted *facing page* 24. It was found in one of the most ancient tombs of the Necropolis of Tarquinii, and consists of three teeth, two upper central incisors and the second bicuspid on the left, which, however, is missing. To support these teeth the Etruscan dentist has made use of the canine and lateral incisor on the right, the canine, bicuspid and the first molar on the left, connecting them

An Etruscan denture

by a continuous series of gold rings soldered together in the manner of gold bridge work. The missing incisors are replaced by an ox tooth, which has been grooved in the centre to give it the appearance of the two middle incisors. This large tooth is fixed by means of two pivots to the gold band that encircles it.

Another denture, which was found in an ancient Etruscan tomb, is exhibited in the Civic Museum of Corneto. It is formed of two bands of gold soldered together at their extremities, and divided by four partitions, forming in all five spaces. (Fig. 1, *facing page* 21.) Three of these evidently are intended for the insertion of the natural teeth, the other two maintained, by means of pivots, two inserted human teeth. One of these has been lost, but the other is still firmly fixed in its place there by this pivot. Two other dentures are to be found in the Museum of the Conte Bruschi at Corneto, one of which is especially interesting. The first is an appliance probably intended to avoid the bad effects of convergence, and consists of four rings, representing the upper canine on the right, and the three neighbouring incisors. It was evidently intended to support a single inserted tooth, but this has disappeared, although the pivot by which it was fixed to the ring is still in situ. The second one is formed of two rings, the one surrounding the left upper canine and the other the left middle incisor. Between these rings, instead of the usual pivot, is a small horizontal bar of gold soldered to the two rings; forming a really beautiful example of bridge work. (Fig. 2, *facing page* 21)

Other examples of Etruscan skill in dentistry

Another example of early dentistry was discovered in the ancient Etruscan necropolis. This appliance was found adhering to a piece of upper jaw in which the four teeth on each side appear to have remained in their place until the end of life. The denture is made of pure gold, and is crossed back upon itself, the ends being soldered together, and, by the aid of two partitions, three spaces are formed. There is no pivot throughout, so it is probable the appliance was made to prevent the loss of the two incisors by giving them support. (Fig. 4, *facing page* 21)

The gold used by the Etruscan dentists was practically pure and soft, and was so malleable that it readily lent itself to manipulation.

From these interesting examples of Etruscan dentistry which have been preserved, the high pitch to which the art had reached at this period may be judged. They certainly establish the Etruscan dentist as by far the most clever and ingenious craftsman in his art among the people of antiquity.

CHAPTER VI

DENTISTRY AMONG THE ROMANS

Roman artificial teeth, 450 B.C.

From actual records there is evidence that the dental art was known in Rome a considerable time before medicine became practised as a profession. In the Law of the Twelve Tables, which was promulgated and written in that city about 450 B.C. by a body of ten magistrates appointed for the purpose, mention is made of teeth bound with gold.

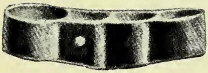
It was customary among the wealthy Romans to burn or bury articles of gold with the dead, but as the precious metal was becoming scarce at this time, it was thought wiser to place some restrictions on the custom. The actual translation of the text is as follows:—

"Neither shall gold be added thereto (to the body), but it shall not be unfaithful to bury or burn it with the gold with which the teeth may perchance be bound together."

It is apparent from this that even at four-and-a-half centuries before the Christian era, there were individuals who practised dentistry in Rome, and, as there is evidence of the use of artificial teeth among the Etruscans before that period, it is probable it was introduced by them to the Romans. Although at this time there were no regular medical practitioners in Rome, a dental appliance of peculiar interest has been found in the Greco-Roman Necropolis at Teano, near Caserta. It consists of three human teeth fixed in a series of rings, made of laminated gold wire, which are turned round the teeth and soldered. This denture was fixed to the mandible of the skeleton of a woman in a tomb, which, according to authorities, dates between 400 and 300 B.C.

The value of a Roman tooth

Apparently the Romans, like the Hebrews, attached great importance and value to their teeth, as, in another of the Laws of the Twelve Tables, it is stated, "Whosoever shall cause the tooth of a free



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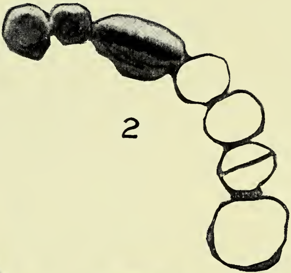

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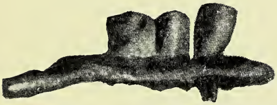

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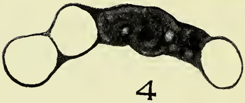

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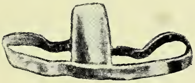

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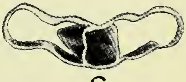

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1.—Etruscan Artificial Gold Denture for an artificial bicuspid (missing).

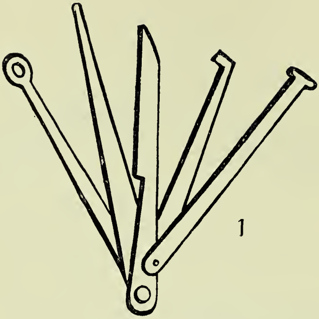
2.—Etruscan Artificial Denture for three teeth, two of which are formed from an ox tooth.

3.—Roman Artificial Denture.

4.—Roman Artificial Denture, shown from above.

5.—Roman Artificial Denture with crown of lower incisor in gold.

6.—Roman Artificial Denture with crown, shown from below.



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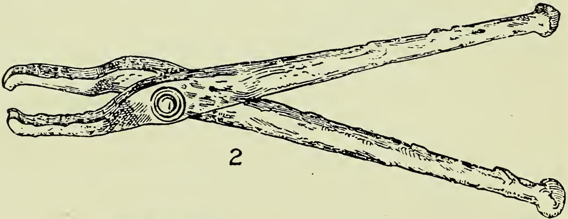

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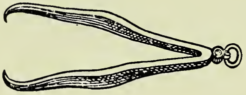

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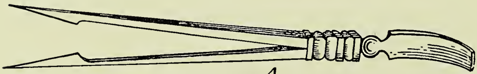

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1.—Roman Toothpick and Toilet Etui.

2.—Roman Dental Forceps excavated at Saalburg, Germany.

3 and 4.—Roman Dental Instruments—"Volselles"—described by Celsus.

man to fall shall pay a fine of 300 *as*,* and for that of a slave 150 *as*."

Cornelius Celsus, 30 B.C., on the hygiene of the mouth

Probably the first Greek physician to introduce the practice of medicine into Rome was Archagathus, about 218 B.C. After the conquest of Greece he was followed by many others, and the practice of the medical art was carried out almost entirely by these physicians. Among those who have left records of this period is Cornelius Celsus, who wrote one of the most interesting works dealing with medicine of that period. The place of his birth is uncertain, but he is supposed to have been born either in Rome or Verona about the year 30 B.C. In his work "De Medicina," he makes several allusions to the hygiene and diseases of the mouth. We learn from him that the children were especially subject to serpiginous ulcers of the mouth. He alludes also to the ailments due to dentition, convulsions and the accompanying fever. That tooth-ache must have been rife among the Romans is evident from the various recipes for masticatories and narcotics for inducing sleep in the sufferers. One of these compounds is composed of mandrake, poppy, pepper, castorium, cinnamon and other drugs. Concerning tooth-ache, Celsus sympathetically remarks, "it may be numbered amongst the worst of tortures." To obtain relief, the patient should abstain entirely from wine, and at first even from food, afterwards he may partake of soft food but very sparingly, so as not to irritate the teeth by mastication. Meanwhile he must, by means of a sponge, let the steam of hot water reach the affected part, and apply externally on the side corresponding with the pain a cerate of cyprus or of iris, on which he must then place some wool, and keep the head well covered up. For violent pain, Celsus recommends the application of hot poultices on the cheek and holding in the mouth hot liquid prepared with a suitable herb, changing it very frequently. For this purpose, hyoscyamus leaves and the root of the mandrake are advised, or the poppy head, the use of which has come down to us for the same purpose at the present day.

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* The *as* was equivalent to about fivepence

For caries, Celsus advises that there should be no haste in extracting the tooth, but that the pain should be relieved by medicines if possible, and he gives many recipes for this purpose. In the sixth book of his work he deals with diseases affecting the soft parts of the mouth, including tonsillitis and ulceration. Diseases of the gums and abscesses are also fully described. He recommends that an abscess should be lanced before it is perfectly ripe, so that the pus may not remain too long in the diseased part. After the pus has been extracted, if the wound be a small one, he says, it is sufficient to keep hot water in the mouth and to use fomentations of steam.

Treatment of dental abscess

Finally, he alludes to extraction, and, from the method he describes, the process must have been a most painful one for the patient. "When a tooth aches, and it is thought well to extract it," he remarks, "the gum must be detached all round, and then the tooth must be shaken until it is well loosened, it being very dangerous to draw a firm tooth, as this may sometimes give rise to dislocation of the jaw, and greater still is the danger in regard to the upper tooth, as this may cause a shock to the temples and eyes. After having well loosened the tooth, it must be pulled out by the fingers, if this is possible, or, if not, by the forceps."

The Roman method of extraction

Celsus describes the operative procedure in detail, and enumerates the instruments employed in dental surgery in his time, viz.:—

1. Ordinary forceps, for the extraction of teeth, which have now become the dental forceps of various patterns for each tooth.

2. The rhizagra, for the extraction of roots, transformed now into forceps.
3. The vulsellum, used for taking out splinters. There were a great many different forms of this instrument, most of them being of bronze, others in steel or in iron.
4. The specillum, for exploration, which is now known as the probe.
5. The cautery, used to allay inflammation of the gums, was a simple rod of metal made red hot and applied to the part.

Although the Romans were acquainted with dental prosthesis, the physicians did not practise it, but contented themselves with treating the affections of the gums, with combating pain, the care of the teeth, and, when necessary, their extraction. The dentures and artificial teeth were probably manufactured by special craftsmen, but the latter apparently were not long in withdrawing the boundaries from a profession which had become very lucrative, for little by little they undertook the treatment of teeth, and also practised extraction.

Treatment for loosened teeth

Celsus states that if, by a blow or other accident, some teeth become loosened, it is necessary to bind them with wire to the neighbouring firm teeth, and to keep in the mouth astringent substances, for instance, wine in which rind of pomegranate has been boiled, or into which some burning hot gall nuts have been thrown.

From the writings of Celsus it will be seen that the treatment for tooth-ache and other ailments of the mouth in ancient Rome was quite rational, and that dentistry must have attained a certain position in those early days.

Pliny the younger, who was born about A. D. 23, in his work on "Natural History," also remarks on the teeth. He enumerates a large number of remedies used in his time against tooth-ache, but on the whole they are much less likely to have been effective than those mentioned by Celsus, as most of his remedies are mixed up with charms and superstition and are more akin to those of the "wise woman" than the experienced practitioner. As an instance of this, he recommends that the ashes of the dung of mice, with dried liver of lizards, be placed in a hollow tooth.

Pliny on the teeth

Another remedy of this type, mentioned by Appolonius as being very efficacious in relieving pain of the gums, consisted in rubbing them with the tooth of a man who had suffered a violent death.

For use as dentifrices, egg-shells deprived of their internal membrane were calcined and powdered. Stags' horn and burnt pumice stone were also used for the same purpose.

The "Epigrams of Martial" (A.D. 40–101) contain many allusions to dentistry, and he also refers to the toothpick, *dentiscalpia*, which the Romans generally used, made of lentisk wood. It is interesting that in the absence of this wood they did not disdain to use the quill. Roman toothpicks of gold and silver have also been excavated, and are sometimes included in the little toilet etuis that are found now and again in Roman tombs.

The "Epigrams of Martial," A.D. 40-101

In the days of Martial, artificial teeth must have been used by the Romans, as, in his epigrams, he makes several allusions to them. "I am not accustomed to clean bought teeth," are the words he makes a "tooth powder" say to a toothless old woman, and in another instance he remarks, "Without shame thou usest purchased lots of hair and teeth. Whatever will you do for the eye, Lælia?" from which it may be inferred that though artificial teeth could be acquired, the artificial eye had not yet come into use.

Removable artificial teeth

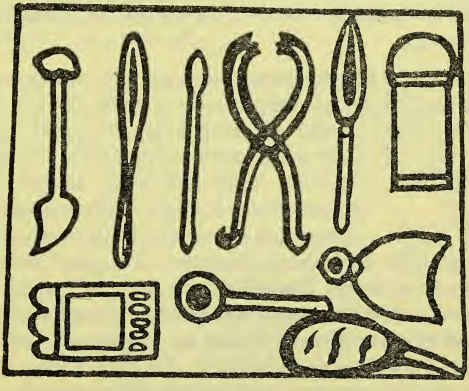
One other allusion of Martial's among his epigrams is of distinct importance, as it implies that artificial teeth were used for other than ornamental purposes. In alluding to an old woman, he remarks, "She at night lays down her teeth just as she does the silken robes."

So it is evident that at this time the artificial denture could be removed with great ease.

In a further passage the following allusion is made to the composition of artificial teeth in a reference to a certain individual, "She has all her teeth, because of her false teeth of bone and ivory."

Earliest known crown work

The mechanical ingenuity of the Roman dentists may be judged from an interesting denture excavated at Satrium, near Rome, which consists of a band and a crown of a lower incisor made of gold; the earliest known specimen of crown work. It is evident from the appliances discovered that both bridge and crown work were known to the Etruscans and the Romans, and it shows the high pitch which dentistry had reached early in the Christian era.



ROMAN DENTAL INSTRUMENTS
From a sculptured marble tablet at the Lateran Museum, Rome

As no allusions are made by early writers to the practice of dentistry by the physicians, it is probable, as already stated, that those who undertook the extraction of teeth, and made artificial dentures, carried on a separate calling. Martial alludes to a certain Cascellius who "extracts carious or diseased teeth," this being the first instance in which the name of a dentist is handed down to posterity.

The first dentist known by name

Among other Roman writers who allude to dentistry, mention should be made of Scribonius Largus, who was physician to the Emperor Claudius, and who accompanied him to England in the year 43. In his book, "De Compositione Medicamentorium," he gives many remedies for tooth-ache, but states that the only true cure is the forceps; but, he adds, it is not always advisable to practice extraction even when the tooth is affected with caries, but it is in many cases much better to cut away the diseased parts with a scalpel designed for the purpose.

The mouth-washes, masticatories and fumigations he mentions are similar to those already enumerated. He also alludes to the use of hyoscyamus seeds, when placed on burning charcoal, as a cure for toothache by fumigation.

Scribonius Largus waxes eloquent on dentifrices, and gives an interesting recipe for one which he states "is used by Octavia, the sister of Augustus, to strengthen her teeth and make them beautiful." It was prepared with barley flour, kneaded to a paste with vinegar and honey mixed together. This was divided into six pills, each of which was to be mixed with half an ounce of salt. The pills were then to be baked in an oven until carbonised, then finally reduced to powder, and as much spikenard added as necessary to give the whole an agreeable perfume. Another recipe which he gives throws an interesting light on the toilet preparations used by the great ladies of the period.

A notable dentifrice used by Octavia

This is the dentifrice used by Messalina, the wife of the Emperor Claudius. It was composed of calcined stags' horn, mastic and sal ammoniac.

Trephining advocated

Probably the earliest allusion made to an actual dental operation other than extraction occurs in a work by Archigenes, who lived in Rome towards the end of the first century and at the beginning of the second, where he acquired great renown as a physician and an operator. He was the first to conclude that tooth-ache in certain cases arises from a diseased condition of the interior part of the tooth. When a tooth appears discoloured without being affected by caries, and yet subject to violent pain which no remedies appear to relieve, Archigenes recommended its perforation with a small trephine. He applied the instrument to that part of the crown which was least discoloured, and trephined down to the centre of the tooth. His idea was, that the pain was caused by the existence of morbid matter in the interior of the tooth, and he thus allowed it a fresh exit. It is, however, evident that Archigenes must have known something of the structure of the tooth, and the existence of the pulp cavity. Galen afterwards described a similar method of treatment *(see page* 19*)*.

A decadence in dental art

As time went on, it would appear, from a study of the works of the Roman writers, a period of decadence set in with regard to dentistry. Cures for tooth-ache became mixed with charms, incantations and other superstitious practices. Paul of Ægina, who lived in the 7th century, is the last of the Roman writers on medicine to advocate what may be called a rational treatment. He clearly distinguishes between epulis and parulis, and describes the former as a fleshy excrescence of the gums in the neighbourhood of a tooth, and the latter as a disease of the gum. In extracting a tooth, he advises a procedure similar to that advocated by Celsus. He recommends that, before extraction, a hollow tooth should be packed with lint in order to avoid crumbling under the pressure of the instrument. He also mentions the filing of teeth if one protrudes over another, and the removal of the sharp edges of broken teeth. Tartar incrustations, he advises, should be removed by scrapers or by means of a small file. He further remarks that hard foods tend to preserve the teeth and keep them healthy, and advises that they should be cleaned carefully after the last meal of the day.

An endeavour has been made in the foregoing pages to trace briefly the evolution and development of the dental art from prehistoric times to the close of the Roman period.

From the records that have been preserved, and the specimens of ancient dental workmanship brought to light by archæological excavation, it is evident that the Greeks paid attention to the teeth and the mouth, and that they recognised the importance of dentistry to the well-being of the individual.

The Etruscans certainly made a great advance in prosthesis, and the Romans probably adopted their methods and improved on their craftsmanship. Thus, in the later period of their splendour, the Romans developed dentistry to a considerable extent, and we find that crowning with gold and bridge work (both of which are generally thought to be of recent origin) were known to and practised by them some two thousand years ago.

For the Dental Profession only

SOME RELIABLE PREPARATIONS
FOR
DENTAL USE

Issued by:—

BURROUGHS WELLCOME & CO.
LONDON (ENG.)
NEW YORK MONTREAL SYDNEY CAPE TOWN MILAN
SHANGHAI BUENOS AIRES BOMBAY

NOTABLE ACHIEVEMENTS IN SYNTHETIC MEDICATION

THE use of supra-renal extract as styptic is based upon the historic primary observation of Oliver in 1897. Placing upon a small artery in the mesentery of a frog a fragment of dried supra-renal medulla, he saw through the microscope local constriction, "which," in the words of Schäfer, "eventually became so great that blood ceased to be driven through the particular artery."

The discovery of 'Epinine'

The isolation of the active principle of the gland led to many attempts to synthesise the substance. Researches conducted by Burroughs Wellcome & Co. with the object of producing a satisfactory synthetic hæmostatic, embraced physiological trials of a large number of synthetic substances having the adrenine action. From papaverine, an alkaloid native in opium, 'Lodal' was derived, from which, by oxidation, 'Epinine' was synthesised, intimately resembling the adrenine series in chemical structure and possessing the characteristic physiological actions of adrenine itself.

In this way, the synthetic hæmostatic 'EPININE' was discovered, and a reliable preparation added to the armoury of the dental practitioner.

TRADE 'EPININE' MARK

Applied locally to a mucous membrane, 'Epinine' produces marked blanching and local anæmia by constriction of the capillaries. It is this local vasoconstrictor action which gives importance to 'Epinine' in dentistry, and, quantitatively, this action can be strikingly demonstrated by measurement of its effects upon blood-pressure (*see Diagram*, *page* 36).

By this means the ratio of activity of adrenine* to 'Epinine' has been determined as 10 : 1 in the cat. Effective equivalence is obtained by using

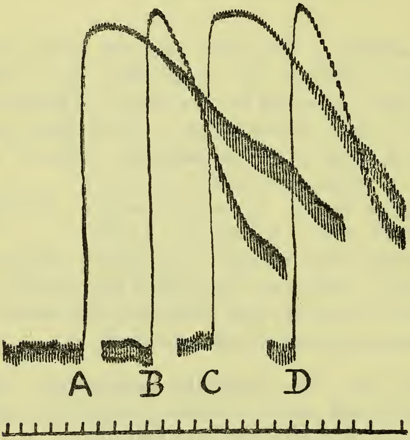
---

* In U.S.A. adrenine is commonly known as epinephrin

Equivalence

'Epinine' in solutions ten times the strength of those of adrenine. The difference in activity is thereby reduced to one of duration, the effects of 'Epinine' on blood-pressure being slightly longer maintained.

KYMOGRAPHIC TRACINGS
SHOWING EFFECTS OF 'EPININE' AND ADRENINE
ON THE BLOOD-PRESSURE



A = Injection of 0·5 mgm. 'Epinine'
B = Injection of 0·05 mgm. Adrenine
Note equal heights of A and B, but greater persistence of A

Salient advantages

'Epinine' is more stable and less liable to decomposition than the natural supra-renal active principle. Being a pure synthetic preparation its composition and characters are constant. Solutions of 'Epinine' can be sterilised by boiling without undergoing decomposition.

Many clinical reports have been received, confirming the marked styptic action of 'Epinine.'

The uses of 'Epinine' correspond in every respect to those of the natural supra-renal extract.

'EPININE,' 1 in 100, is issued in bottles of 10 c.c. and 25 c.c.; also as 'VAPOROLE' 'EPININE,' 1 in 100, in boxes of 10 containers of 1 c.c., sterilised and ready for immediate use.

NOTABLE DEVELOPMENTS IN LOCAL ANÆSTHESIA

In the domain of dentistry, a vaso-constrictive effect in conjunction with local anæsthesia is of especial value. By reason of the vaso-constriction, the action of the local anæsthetic is limited mainly to the point of application; the induction of anæsthesia is consequently hastened; and, inasmuch as the dose of anæsthetic is concentrated within the confines of vaso-constriction, the intensity of anæsthesia is increased, absorption is retarded, the duration of anæsthesia is prolonged, and the twin dangers of toxicity and idiosyncrasy are correspondingly inhibited or restrained.

Effective alliance

TRADE 'EPICAINE' MARK

('Epinine' and Cocaine Hydrochloride)

In 'Epicaine,' the action of cocaine is enhanced by its association with 'Epinine.' Recent clinical reports demonstrate that 'Epicaine' produces an amount of hæmostasis efficiently limiting the anæsthesia to the field of operation, without danger of sloughing. "The field around the first (primary) puncture became anæmic almost immediately . . . . the hæmorrhage was in all cases slight in degree." In typical extractions "anæsthesia was perfect"; in others, the perception of pain was reduced to a point short of abolition.

Clinical demonstration

In a case of hypersensitive dentine, with filling of a mesial cavity in the right lower second bicuspid, "25 minims of 'Epicaine' were injected into fairly healthy gums with a slight degree of gingivitis, for the purpose of anæsthetising the pulp. No pain was experienced on drilling out the tooth. The surroundings of the tooth were quite healthy."

As typical of extractions, the following may be quoted: "Roots of right lower first molar with slight gingivitis. Anæsthesia was perfect with 20 minims of 'Epicaine.' The periosteum surrounding the roots was chronically inflamed. The roots were extracted quite painlessly."

The strengths of 'Epinine' and 'Epicaine' usually employed are tabulated below :—

PREPARATION	USES	STRENGTH OF SOLUTION	HOW MADE
'Epinine' 1 in 100	Vaso-constrictor, hæmostatic, astringent		
	For local application to teeth and gums	A strength of 1 in 1000 which is commonly employed is obtained by diluting one part of 'Epinine' with nine parts of normal saline solution	
'Vaporole' 'Epinine' 1 in 100	Vaso-constrictor, hæmostatic, astringent		
	For local application to teeth and gums	1 in 10,000 to 1 in 100	A strength of 1 in 10,000 is obtained by diluting one product with 99 c.c. of normal saline solution
'Epicaine' ('Epinine' and Cocaine Hydrochloride)	Vaso-constrictor and anæsthetic		Half to 1 c.c. of 'Epicaine,' or a solution of 'Epinine' combined with a solution of cocaine, may be used
	(*a*) For injection into the gums	'Epinine' 1 in 3,333 ;	
	(*b*) For local application	Cocaine Hydrochloride 1 in 50	
'Vaporole' 'Epicaine' ('Epinine' and Cocaine Hydrochloride)	Vaso-constrictor and anæsthetic		
℞ 'Epinine,' 0·0003 gm. [gr. 1/216] Cocainæ Hydrochloridi, 0·02 gm. [gr. 1/3] Aquam ad 1 c.c.	(*a*) For injection into the gums	'Epinine' 1 in 3,333 ;	Ready for use
	(*b*) Local application to the teeth	Cocaine Hydrochloride 1 in 50	

'EPICAINE' is issued in bottles of 10 c.c.; also as 'VAPOROLE' 'EPICAINE,' in boxes of 10 containers of 1 c.c.; sterilised and ready for immediate use. Each c.c. contains 'Epinine,' 0·0003 gm. (gr. 1/216), and Cocaine Hydrochloride, 0·02 gm. (gr. 1/3).

TRADE MARK ‘SOLOID’ BRAND ANÆSTHETICS

Where a general inhalation-anæsthesia is contra-indicated by cardiac or pulmonary trouble, or alcoholism, etc., or the patient is excitable and unusually strong ; or, where exceptional care and time is needed ; or, if sepsis and inflammation of the gums do not contra-indicate its employment, local anæsthesia is of advantage.

In such cases, the anæsthetic is generally combined with ‘ Epinine.’

‘SOLOID’ products enable the dentist to prepare, at a moment’s notice, local anæsthetic solutions in strengths suitable for dental work. Stock solutions undergo chemical changes, but with ‘ Soloid ’ products, fresh active solutions are immediately available.

Reliable local anæsthetics

PREPARATION	USES	STRENGTH OF SOLUTION	HOW MADE
‘Soloid’ Cocaine Hydrochloride, gr. 1/2 [0·032 gm.] ; gr. 1 [0·065 gm.] ; and gr. 5 [0·324 gm.]	Local anæsthetic for dental work	4 per cent. or stronger	One gr. ½ product in min. 14, one gr. 1 product in min. 27, or one gr. 5 product in min. 137, of water, yields a four per cent. solution
‘Soloid’ Cocaine and Eucaine ℞ Cocainæ Hydrochlor., Eucainæ Lactatis, āā gr. 1/2 [0·032 gm.]	Local anæsthetic for dental work	2 per cent., or more, of each ingredient	One product in min. 27 of water, yields a four per cent. solution of the combination
‘Soloid’ Eucaine Hydrochloride, gr. 1 [0·065 gm.] ; and gr. 5 [0·324 gm.]	Local anæsthetic for dental work	4 per cent. or stronger	One gr. 1 product in min. 27, or one gr. 5 product in min. 137, of water, yields a four per cent. solution
‘Soloid’ Eucaine Lactate, gr. 1 [0·065 gm.] ; and gr. 5 [0·324 gm.]	Local anæsthetic for dental work	4 per cent. or stronger	
Eucaine salts are less toxic than cocaine			

For packings and prices, see Wellcome’s Excerpta Therapeutica

RELIABLE APPLIANCES FOR HYPODERMIC MEDICATION, ETC.

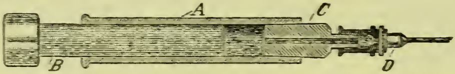
HYPODERMIC SYRINGES

In dentistry, the use of a reliable hypodermic syringe is of great importance. Syringes issued by Burroughs Wellcome & Co. fulfil every requirement for efficiency, durability and convenience in use, and are the result of great experience, and of a careful study of the needs of the dental profession.

ALL-GLASS ASEPTIC HYPODERMIC SYRINGE

THE B. W. & CO.

This instrument has earned the reputation of being "the syringe that lasts." In one instance it is reported to have withstood 10 years' hard usage, without any necessity for repair. Another report describes it as "by far and away the handiest and most satisfactory hypodermic (syringe) on the market"; and, in a third case, the reporter says "I consider it ideal." Similar reports are quite frequent.



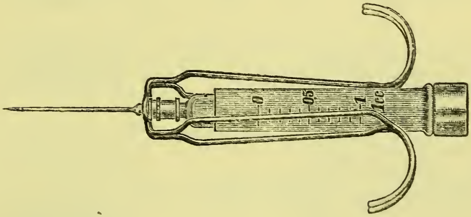
The B. W. & Co. All-Glass Aseptic Hypodermic Syringe

The B. W. & Co. All-Glass Aseptic Hypodermic Syringe is made of well-annealed glass of the finest quality and has no washers, cement or screw-threads in its construction. It removes every difficulty associated with securing asepsis. The working surfaces are ground to fit each other with such accuracy that the solid piston *B* glides easily and evenly within the barrel *A*. The nozzle *C* fits into the barrel *A* by means of a perfect plug joint, and takes a needle *D* of the usual pattern, or a dental needle.

Absolute asepsis

Except during its passage through the needle, the solution comes into contact with glass surfaces only, and the parts of the syringe are instantly detachable and readily rendered aseptic.

The desired solution may be made in the syringe itself. The accurate adjustment of all the parts prevents leakage and ensures efficient dosage.



The B. W. & Co. All-Glass Aseptic Hypodermic Syringe, with the 'Tabloid' Brand Detachable Sheath-Grip

The distinguishing characteristics of the B. W. & Co. All-Glass Aseptic Hypodermic Syringe are, therefore, the facility with which asepsis can be secured and maintained, and the extreme accuracy of dosage ensured by its perfect power of expulsion.

A detachable finger-grip and a 'Tabloid' Detachable Sheath-Grip are issued for use with this syringe.

The 'Tabloid' Detachable Sheath-Grip, as shown in position above, may be applied or removed instantly, and when in use becomes to all intents and purposes part of the syringe. Its use imparts steadiness and precision when making an injection.

Issued in various sizes: min. 15, min. 20 and 1 c.c., complete with two regular steel needles; also min. 40 and min. 60, with two intramuscular steel needles.

TRADE MARK 'TABLOID' BRAND

HYPODERMIC PRODUCTS

The introduction of drugs directly into the tissues or the circulation, calls for exceptional accuracy of dosage and purity of product.

The addition of a given 'Tabloid' Hypodermic product to a suitable quantity of sterile water ensures a solution which represents a stated quantity of pure drug in its fullest activity.

PREPARATION	USES	STRENGTH
'Tabloid' Hypod. Cocaine Hydrochloride, gr. 1/10 [0·0065 gm.]; gr. 1/6 [0·011 gm.]; gr. 1/4 [0·016 gm.]; and gr. 1/2 [0·032 gm.]	Local anæsthetic	The hypodermic dose is gr. 1/10 [0·0065 gm.] to gr. 1/2 [0·032 gm.]
'Tabloid' Hypod. Eucaine Hydrochloride, gr. 1/3 [0·022 gm.]; and gr. 1 [0·065 gm.]	Local anæsthetic	The hypodermic dose is gr. 1/10 [0·0065 gm.] to gr. 1/2 [0·032 gm.]
'Tabloid' Hypod. Eucaine Lactate, gr. 1/3 [0·022 gm.]; and gr. 1 [0·065 gm.]	Local anæsthetic	The hypodermic dose is gr. 1/10 [0·0065 gm.] to gr. 1/2 [0·032 gm.] Twenty per cent. solutions of eucaine lactate are easily obtained
'Tabloid' Hypod. Anæsth. Compound (A) ℞ Cocainæ Hydrochloridi, gr. 1/10 [0·0065 gm.] Morphinæ Hydrochloridi, gr. 1/50 [0·0013 gm.] Sodii Chloridi, gr. 9/10 [0·058 gm.]	Local anæsthetic	'Tabloid' Hypod. Anæsthetic Compounds A and B are employed in general surgery, to secure local anæsthesia of comparatively large areas by infiltration, and for this purpose one product is dissolved in min. 110 [6·5 c.c.] of sterile water. For dental purposes, one may be dissolved in min. 15 of water, and injection made into the gum
'Tabloid' Hypod. Anæsth. Compound (B) ℞ Cocainæ Hydrochloridi, gr. 1/5 [0·013 gm.] Morphinæ Hydrochloridi, gr. 1/50 [0·0013 gm.] Sodii Chloridi, gr. 9/10 [0·058 gm.]	Local anæsthetic	*See above*

PREPARATION	USES	STRENGTH
'Tabloid' Hypod. Anæsth. Compound (C) ℞ Eucainæ Lactatis, gr. 7/16 [0·028 gm.] Sodii Chloridi, gr. 3-15/16 [0·255 gm.]	Local anæsthetic	One, dissolved in one ounce of sterile water, yields a solution containing 1 in 1000 eucaine lactate and 9 in 1000 sodium chloride

In dental practice the administration of local anæsthetics is generally combined with the use of 'Epinine' *(see pages* 35 *and* 36*).*

'Tabloid' Hypod. Strychnine Hydrochloride gr. 1/200 [0·00032 gm.]; gr. 1/100 [0·00065 gm.]; and gr. 1/30 [0·0022 gm.]	Cardiac and respiratory stimulant	The hypodermic dose is gr. 1/150 [0·00043 gm.] to gr. 1/10 [0·0065 gm.]
'Tabloid' Hypod. Strychnine Nitrate, gr. 1/15 [0·0043 gm.]; and gr. 1/10 [0·0065 gm.]	Cardiac and respiratory stimulant	The hypodermic dose is gr. 1/150 [0·00043 gm.] to gr. 1/10 [0·0065 gm.]
'Tabloid' Hypod. Strychnine Sulphate gr. 1/150 [0·00043 gm.]; gr. 1/100 [0·00065 gm.]; gr. 1/60 [0·00108 gm.]; gr. 1/50 [0·0013 gm.]; gr. 1/40 [0·0016 gm.]; gr. 1/30 [0·0022 gm.]; and gr. 1/20 [0·0032 gm.]	Cardiac and respiratory stimulant	The hypodermic dose is gr. 1/150 [0·00043 gm.] to gr. 1/10 [0·0065 gm.]
'Tabloid' Apomorphine Hydrochloride and Strychnine Hydrochloride ℞ Apomorphinæ Hydrochloridi, gr. 1/10 [0·0065 gm.] Strychninæ Hydrochloridi, gr. 1/60 [0·00108 gm.]	Prompt emetic	One dissolved in water to be injected hypodermically promptly produces emesis. The strychnine prevents the prostration which occasionally follows the use of apomorphine

For packings and prices, see Wellcome's Excerpta Therapeutica

TRADE MARK 'VAPOROLE' BRAND PRODUCTS

'VAPOROLE' Brand products intended for hypodermic injection are issued in hermetically-sealed containers of special design, whilst those for inhalation are contained in thin glass capsules, surrounded by absorbent material and enclosed in silken netting.

Each 'Vaporole' product for hypodermic injection contains the stated weight of medicament dissolved or suspended in a suitable vehicle **sterilised and ready for immediate use.**

The 'Vaporole' containers are noteworthy in construction and convenience. They will stand on any convenient level surface, leaving both hands of the operator free to hold the syringe whilst filling it.

Instant availability is a feature of these products. A mark is made on the neck of the container with the special opener enclosed in each box and the top of the container snapped off. The solution may then be drawn up into the syringe and injected immediately.

The contents of each 'Vaporole' product are sufficient to enable 1 c.c. (approx. min. 16) to be injected.

For Hypodermic Injection

'VAPOROLE' BRAND—
,, COCAINE HYDROCHLORIDE, 0·01 gm. [gr. 1/6]
,, ,, ,, 0·02 gm. [gr. 1/3]
,, 'EPININE' *(Trade Mark)*, 1 in 100
,, 'EPICAINE' ('Epinine' and Cocaine Hydrochloride) *(see pages 35 and 37)*
(Trade Mark)
℞ 'Epinine' .. .. .. 0·0003 gm. [gr. 1/216]
Cocainæ Hydrochloridi .. 0·02 gm. [gr. 1/3]
Aquam .. .. ad 1 c.c.
,, EUCAINE LACTATE, 0·01 gm. [gr. 1/6]
,, STRYCHNINE SULPHATE, 0·001 gm. [gr. 1/65]
,, ,, ,, 0·002 gm. [gr. 1/32]

In boxes of 10 containers of 1 c.c.

For Inhalation

TRADE MARK 'VAPOROLE' BRAND AROMATIC AMMONIA

FOR USE AS "SMELLING SALTS"

A restorative *de luxe* (*see page* 55).

'VAPOROLE' AMYL NITRITE

Min. 3 [0·178 c.c.]; and min. 5 [0·296 c.c.]

'Vaporole' Amyl Nitrite is of especial value in threatened fainting and collapse, and as a restorative after gas in extractions. As antidote, in chloroform syncope, 'Vaporole' Amyl Nitrite affords the quickest means of restoring the heart's action. The effect of amyl nitrite on the pulse can be demonstrated within ten seconds, after inhalation. It is, therefore, an emergency remedy of great potency and rapidity of action.

In boxes of 12 products

TRADE MARK 'VAPOROLE' BRAND CHLOROFORM AND ETHYL IODIDE COMPOUND

℞ Chloroformi	..	..	min. 10 [0·592 c.c.]
Ethyl Iodidi	..	..	min. 5 [0·296 c.c.]
Menthol	..	..	gr. 1/8 [0·008 gm.]

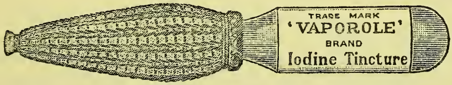
This product is of use in the relief of dyspnœa and laryngeal spasm. Inhaled as an anæsthetic, ethyl iodide relieves spasmodic dyspnœa, and in angina pectoris and spasmodic asthma it is one of the best remedies. Additional value is lent to this action by chloroform. 'Vaporole' Chloroform and Ethyl Iodide Compound may be used with advantage in such spasm of the upper respiratory tract and larynx with partial or complete occlusion of the airway, as is frequently met with in patients of a florid short-necked type, under nitrous oxide or ether anæsthesia.

In boxes of 6 products

TRADE MARK 'VAPOROLE' BRAND IODINE TINCTURE

(3 % weight in volume)

'Vaporole' Iodine Tincture presents pure tincture of iodine in hermetically-sealed containers, and of a strength suitable for external application in dentistry. Tincture of iodine is a powerful, penetrating and comparatively non-poisonous germicide. 'Vaporole' Iodine Tincture allows of the immediate application of fresh, perfectly stable tincture of iodine, to unbroken surfaces, or wounds, simply by breaking the point of the container. By this means the absorbent material surrounding the point is saturated with solution, and can be used as a dental swab.



'Vaporole' Iodine Tincture. Actual size

In boxes of 6 containers of min. 20, and in 1/2 oz. containers

NOTABLE DEVELOPMENTS IN VACCINE THERAPY

Of all the avenues by which germs can enter the body, the mouth is obviously the most important, as giving access to the alimentary tract, affording extensive opportunities for the development of germs. Even from the most cleanly mouth, oral streptococci can always be recovered, and perhaps the surest evidence that persons have been speaking in a room is the finding of salivary streptococci on culture plates exposed to the air. The less cleanly mouth is, in the nature of things, a hot-bed of pathogenic organisms ; in it pathological and putrefactive organisms abound.

Pyorrhœa alveolaris

The incidence of obvious sepsis of the gums and root circumference is, therefore, in nowise exceptional, and it has been calculated that "if twelve teeth with an average root circumference of one inch were affected to an average depth of one-third of an inch, there would be an ulcerated surface of four square inches. Such an ulcer on the face or arm would be the subject of grave concern." * In the mouth, synchronously with direct absorption of toxins from this surface, the discharging pus is continually being swallowed.

The effects of oral sepsis upon the general health are consequently not easily calculable, and the paths of infection numerous.

The indications for vaccine therapy are here obvious, and its use has been attended by a large measure of success.

Working with a mixture of autogenous and stock heterogeneous vaccines, an American observer recently obtained, out of 115 cases in all, 92 per cent. of cures in incipient stages ; 93 per cent. of cures in moderately advanced stages ; and, in far advanced cases, 43 per cent. of cures.†

Other reports agree in indicating that vaccine therapy supplies a rational treatment for pyorrhœa.

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* *British Dental Journal*, August 1, 1912

† *Boston Medical and Surgical Journal*, December 19, 1912

TRADE MARK 'WELLCOME' BRAND

DENTAL STREPTOCOCCUS VACCINE

In pyorrhœa alveolaris, no one organism has been definitely associated with the disease as cause, but, in a majority of cases, streptococcal forms predominate, derived, in the main, from the normal bacterial population of the mouth and alimentary canal. Of a low type of virulence and habituated to a bony environment, the pyogenic colonies are not only difficult of access surgically, but, by reason of the density of osseous structure, somewhat remote from mediate attack through the blood-stream.

Bacterial types

An obstinate chronicity, therefore, characterises the related phenomena. The sepsis is one concerned principally with disease of bone, having, probably, causal relationships with various rheumatoid phenomena.

Nevertheless, the growth of evidence tends to prove that treatment by vaccines, together with a proper dietetic regimen and the maintenance of local measures, distinctly benefits—"cures or relieves the systemic disease as well as the local trouble."

A bacterial vaccine may be described as a sterilised emulsion of a micro-organism. The subcutaneous injection of such a preparation of micro-organisms stimulates the cells of the body to form specific anti-bodies, and this production of anti-bodies goes on for a considerable time after inoculation, thus increasing the degree of immunity.

Dental Streptococcus Vaccine, 'Wellcome' Brand, contains several strains of Streptococcus obtained from cases of pyorrhœa alveolaris and septic conditions of the teeth and gums, for use in cases of pyorrhœa alveolaris, etc. Of this vaccine, the dose is five million organisms, gradually increasing to 50 million, and it may be administered at intervals of 7 to 10 days.

Dosage

Issued in hermetically-sealed phials of 1 c.c. containing 10 million or 50 million organisms.

RELIABLE PRODUCTS FOR ORAL CLEANSING

THE production and maintenance of oral cleanliness, whether pre-operative, post-operative or cosmetic, constitute a surgical precept of high importance. In a septic mouth, direct infection of wound-surfaces may occur ; again, with inhalation-anæsthesia, where "closed" methods entail the continued re-breathing of germ-laden gases, pulmonary infection may be assumed to be a danger ; whilst, in local anæsthesia, the absence of clot renders it, perhaps, especially desirable to safeguard the patient by cleansing the whole cavity.

TRADE MARK ‘SOLOID’ BRAND

ANTISEPTICS AND ASTRINGENTS

‘Soloid’ antiseptics and astringents enable perfectly fresh solutions of definite strength to be accurately prepared at the moment of use, and are infinitely preferable to variable stock solutions in bulk.

Each product is of a suitable weight for a convenient quantity of solvent, and immediately renders a solution of definite strength. A list is given below :

PREPARATION	USES	STRENGTH OF SOLUTION	HOW MADE
‘Soloid’ Alum gr. 10 [0·648 gm.]	Astringent mouth-wash	1 in 50 (approx.)	One dissolved in one ounce of water
‘Soloid’ Alum and Zinc Sulphate ℞ Aluminis, gr. 15 [0·972 gm.] Zinci Sulphatis, gr. 15 [0·972 gm.]	Same as ‘Soloid’ Alum when more powerful solutions are required	One, dissolved in one and a half ounces of water, yields a solution of 1 in 50 (approx.) of each of the ingredients	
‘Soloid’ Alum and Zinc Compound, Strong ℞ Aluminis, gr. 30 [1·944 gm.] Zinci Sulphatis, gr. 15 [0·972 gm.]	Same as ‘Soloid’ Alum when more powerful solutions are required	One, dissolved in one and a half ounces of water, yields a solution of 1 in 25 (approx.) of Alum and 1 in 50 (approx.) of Sulphate of Zinc	

For packings and prices, see Wellcome's Excerpta Therapeutica

PREPARATION	USES	STRENGTH OF SOLUTION	HOW MADE
'Soloid' Boric Acid gr. 6 [0·389 gm.] (*scented with Otto of Rose*); and gr. 15 [0·972 gm.] (*unscented*)	Antiseptic mouth-wash	1 in 75 (approx.)	One gr. 6 product, powdered and dissolved in one ounce, one gr. 15 product in two and a half ounces, of warm sterile water
'Soloid' Boric Acid and Zinc Sulphate (*scented with Otto of Rose*) ℞ Acidi Borici, gr. 6 [0·389 gm.] Zinci Sulphatis, gr. 1/2 [0·032 gm.]	Astringent, stimulant, antiseptic mouth-wash	Boric Acid, 1 in 75, Zinc Sulphate, 1 in 900 (approx.)	One dissolved in one ounce of warm (boiled) water
'Soloid' Carbolic Acid (Phenol) gr. 5 [0·324 gm.]; gr. 20 [1·296 gm.]; and gr. 60 [3·89 gm.]	Antiseptic, caustic and anæsthetic (*a*) To relieve pain of decayed tooth	The pure acid is generally employed with a plug of cotton wool	
	(*b*) To sterilise hands and instruments	1 in 40 to 1 in 20 (approx.)	One gr. 5 product in two drachms, one gr. 20 product in one ounce, one gr. 60 product in three ounces, of water = 1 in 20 (approx.)
	(*c*) As an antiseptic and anæsthetic mouth-wash	1 in 480 (approx.)	One gr. 5 product dissolved in five ounces of water
'Soloid' Chinosol* gr. 1·75 [0·113 gm.] and gr. 8·75 [0·567 gm.]	(*a*) To sterilise hands and instruments	1 in 2000 to 1 in 1000	One gr. 1·75 product in four ounces, or one gr. 8·75, product in one pint, of water = 1 in 1000

* *Not supplied in U.S.A.*

PREPARATION	USES	STRENGTH OF SOLUTION	HOW MADE
'Soloid' Chinosol *(continued)*	(*b*) As a mouth-wash	1 in 5000 to 1 in 2000	One gr. 1·75 product in eight ounces, or one gr. 8·75 product in two pints, of water = 1 in 2000
'Soloid' Copper Sulphate gr. 1 [0·065 gm.]	As a stimulating astringent lotion for indolent ulcers, the antrum, etc.	1 in 200 to 1 in 50	One gr. 1 product dissolved in min. 220 of water = 1 in 200
'Soloid' Corrosive Sublimate (Hydrarg. Perchlor.) gr. 1·75 [0·113 gm.]; gr. 8·75 [0·567 gm.]; and gr. 17·5 [1·134 gm.]	(*a*) To sterilise hands and instruments	1 in 1000	One gr. 1·75 product in four ounces, one gr. 8·75 product in one pint, or one gr. 17·5 product in two pints = 1 in 1000
	(*b*) As a mouth-wash	1 in 5000 to 1 in 2000	One gr. 1·75 product in eight ounces of water = 1 in 2000
'Soloid' Mercuric Potassium Iodide gr. 1·75 [0·113 gm.]; gr. 4·37 [0·283 gm.]; and gr. 8·75 [0·567 gm.]	(*a*) To sterilise hands and instruments	1 in 5000 to 1 in 2000	One gr. 4·37 product in one pint, or one gr. 8·75 product in two pints, of water = 1 in 2000
	(*b*) As a mouth-wash	1 in 5000	One gr. 1·75 product in one pint of water = 1 in 5000
'Soloid' Paraform gr. 5 [0·324 gm.]	As a filling and dressing for root canals	—	—
'Soloid' Zinc Sulphate gr. 1 [0·065 gm.]; and gr. 10 [0·648 gm.]	As an astringent mouth-wash	1 in 200 to 1 in 10	One gr. 1 product in three and a half drachms of water, or one gr. 10 product in four and a half ounces of water = 1 in 200 solution (approx.)

TRADE MARK 'SOLOID' BRAND PRODUCTS

FOR MOUTH-WASHES

An agreeable and efficient mouth-wash can quickly and easily be prepared by dissolving one of the following 'Soloid' products in from two to three ounces of tepid water. The accuracy of these products, and the ease and certainty with which they yield *fresh* solutions of desired strength constitute important recommendations, whilst the time and labour saved in weighing and measuring constituents separately is wholly saved.

'SOLOID' BRAND—

,, (Nasal) **Alkaline Compound—**

℞	Boracis	gr.	5	[0·324 gm.]
	Sodii Chloridi	gr.	5	[0·324 gm.]

,, ,, **Antiseptic and Alkaline Compound—**

℞	Sodii Bicarbonatis	gr.	5	[0·324 gm.]
	Acidi Carbolici	gr.	1/2	[0·032 gm.]
	Boracis	gr.	5	[0·324 gm.]

,, ,, **'Eucalyptia' Compound—**

℞	Sodii Bicarbonatis	gr.	8	[0·518 gm.]
	Boracis	gr.	8	[0·518 gm.]
	Sodii Benzoatis	gr.	1/3	[0·022 gm.]
	Sodii Salicylatis	gr.	1/3	[0·022 gm.]
	Ol. Eucalypti	min.	1/6	[0·01 c.c.]
	Thymol	gr.	1/6	[0·011 gm.]
	Menthol	gr.	1/12	[0·0054 gm.]
	Ol. Gaultheriæ	min.	1/12	[0·005 c.c.]

,, ,, **Phenol Compound—**

℞	Sodii Bicarbonatis	gr.	12	[0·778 gm.]
	Acidi Carbolici	gr.	1-1/2	[0·097 gm.]
	Sodii Chloridi	gr.	2	[0·13 gm.]

,, ,, **Sodium Bicarbonate Compound—**

℞	Sodii Bicarbonatis	gr.	5	[0·324 gm.]
	Boracis	gr.	5	[0·324 gm.]
	Sodii Chloridi	gr.	5	[0·324 gm.]

,, ,, **Sodium Bicarbonate Compound, Saccharated—**

℞	Sodii Bicarbonatis	gr.	5	[0·324 gm.]
	Boracis	gr.	5	[0·324 gm.]
	Sodii Chloridi	gr.	5	[0·324 gm.]
	Sacchari Albi	gr.	5	[0·324 gm.]

,, **Naso-Pharyngeal Compound—**

℞	Sodii Chloridi	gr.	7	[0·454 gm.]
	Boracis	gr.	2-1/2	[0·162 gm.]
	Acidi Borici	gr.	3/4	[0·049 gm.]
	Sodii Benzoatis	gr.	1/2	[0·032 gm.]
	Menthol	gr.	1/50	[0·0013 gm.]
	Thymol	gr.	1/100	[0·00065 gm.]
	Cocainæ Hydrochloridi	gr.	1/6	[0·011 gm.]
	Ol. Gaultheriæ	min.	1/20	[0·003 c.c.]

For packings and prices, see Wellcome's Excerpta Therapeutica

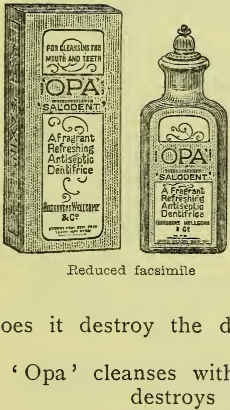
TRADE MARK 'OPA' BRAND

LIQUID DENTIFRICE

A scientifically prepared dentifrice

'OPA' Liquid Dentifrice is a scientifically-prepared product forming an efficient and valuable dentifrice and a pleasant and stimulating mouth-wash. It is an ideal dentifrice to recommend to patients, since they appreciate its refreshing effect and pleasant flavour.

The strong antiseptic and germicidal properties of 'Opa' make it a very valuable adjunct in every-day practice. In cases where patients have neglected their mouths and allowed them to get into bad condition the use of 'Opa' before and after extraction will mitigate the dangers of septic poisoning.


FOR CLEANSING THE MOUTH AND TEETH
'OPA'
'SALODENT'
A Fragrant Refreshing Antiseptic Dentifrice
BURROUGHS WELLCOME & Co
'OPA'
'SALODENT'
A Fragrant Refreshing Antiseptic Dentifrice
BURROUGHS WELLCOME & Co

Reduced facsimile

'Opa' contains no crude antiseptic or flavouring agents, and therefore has no undesirable effect on the delicate structure of the teeth or gums, nor does it destroy the delicacy of the sense of taste.

Persistent antiseptic action

'Opa' cleanses with scientific thoroughness. It destroys septic material, arrests and prevents the action of fermentative germs in the mouth, and preserves and restores the natural whiteness of the teeth. Its effect does not pass away immediately after use, but persists for hours.

A few drops of 'Opa,' added to a tumblerful of water, form an excellent mouth-wash for use after extractions. The after-feeling of refreshment in the mouth is delightful and quite unique.

In bottles of 2 fl. oz. and 4 fl. oz., with sprinklers

RELIABLE PREPARATIONS FOR GENERAL ANÆSTHESIA

GENERAL anæsthesia is given the preference in dentistry where it is of advantage to have the patient unconscious, in multiple extractions, and where unusual force is required from any circumstance.

TRADE MARK 'WELLCOME' BRAND ANÆSTHETICS

Physiological considerations demand of all products employed for the induction of general anæsthesia in dental operations, a high degree of safety, certainty of action and freedom from impurity. These indications 'Wellcome' Brand Anæsthetics are especially fitted to meet.

'WELLCOME' BRAND CHLOROFORM

'Wellcome' Brand Chloroform

Height of bottle, 5 in.

In the production of 'WELLCOME' Brand Chloroform the greatest care is taken to ensure the highest attainable degree of purity and freedom from irritating products of decomposition. It is of uniform composition, and exceptionally reliable. 'Wellcome' Brand Chloroform conforms, in every respect, to the requirements of the British Pharmacopœia.

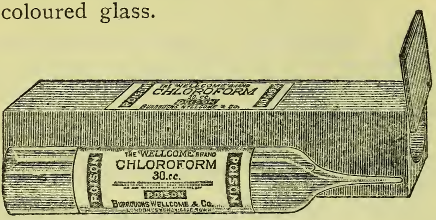
Exceptionally pure

Clinical experience shows that remarkable uniformity of action is attained when the chloroform contains a certain minute amount of ethyl chloride. 'Wellcome' Brand Chloroform is particularly characterised by containing precisely that small, definite proportion of ethyl chloride which is so beneficial in the induction of chloroform anæsthesia.

Constant in composition

Uniform in action

'Wellcome' Brand Chloroform is issued in amber-coloured glass-stoppered bottles, and also in convenient hermetically-sealed tubes. The tubes are made of amber-coloured glass.



'Wellcome' Chloroform tube

Additional convenience has been secured by making the tubes flat, instead of round, at the base.

In bottles of 2 oz., ¼ lb., ½ lb. and 1 lb., and in hermetically-sealed tubes of 30 c.c., 60 c.c. and ¼ lb.

'WELLCOME' BRAND ETHER, PURE, B.P.

ETHER is employed as a local anæsthetic for minor operations ; hypodermically or internally as a cardiac stimulant and anti-spasmodic in fainting, heart-failure, etc., and by inhalation to produce general anæsthesia.

'Wellcome' Brand Ether is characterised by its purity and reliability. It has a specific gravity of 0·720—0·722 and conforms to B.P. requirements.

In hermetically-sealed tubes of 30 c.c. and 60 c.c.

'WELLCOME' BRAND ETHYL CHLORIDE

ETHYL CHLORIDE is employed as a spray to produce local anæsthesia. Its power of producing general anæsthesia, first appreciated by Flourens, in 1847, was rescued from a long desuetude by the accident of two dental surgeons, independently, re-discovering this property while using it for local purposes. Recently it has been largely used by inhalation—mostly for rapid operations—or to induce preparatory general anæsthesia.

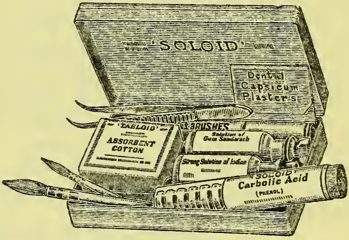
In boxes of 1 doz. 3 c.c. or 5 c.c. hermetically-sealed tubes

RELIABLE ACCESSORIES FOR DENTAL USE

TRADE MARK 'SOLOID' BRAND

DENTAL EMERGENCY CASE, NO. 409

No. 409 'Soloid' Brand Dental Emergency Case is essentially a Dental "First-Aid" outfit, for the use of a patient during temporary absence from his own practitioner.


'SOLOID'
Dental Capsicum Plasters
'TABLOID'
ABSORBENT COTTON
BRUSHES
Solution of Gum Sandarach
Strong Solution of Iodine
'SOLOID' Carbolic Acid (PHENOL)

'Soloid' Brand Dental Emergency Case
Measurements: $3\frac{3}{4} \times 2\frac{1}{2} \times \frac{3}{4}$ in.

Containing materials just sufficient to ease the patient's pain until he can obtain proper professional aid from his own dental attendant, without in any way encouraging amateur dentistry. It is eminently adapted for recommendation to country patients living in remote districts; and for yachting, shooting, mountaineering and camping parties, and so forth.

In aluminised metal.

TRADE MARK 'VAPOROLE' BRAND

AROMATIC AMMONIA

For use as "Smelling Salts"

'VAPOROLE' AROMATIC AMMONIA provides an efficient and agreeable restorative for use as "smelling salts," daintily presented in thin glass capsules, each surrounded with absorbent material enclosed in silken netting, and so fragile that it can instantly be crushed by gentle pressure between the finger and thumb. Pungent, and elegantly perfumed with aromatics, 'Vaporole' Aromatic Ammonia is invaluable in emergencies in the dental surgery in cases of faintness, temporary indisposition and the like.

The ideal restorative

In boxes of 12 products

TRADE MARK 'HAZELINE' BRAND

HAMAMELIS VIRGINIANA

Hæmostatic and mouth-wash

'HAZELINE' is prepared from the volatile principles of the bark of the green twigs of *Hamamelis virginiana.* These volatile principles are entirely absent from the dried drug from which the tincture and fluid extract are prepared. 'Hazeline' is a transparent, colourless fluid, possessed of powerful astringent, styptic and anodyne properties. After dental operations, it may be applied to the gums, by means of cotton wool, to arrest hæmorrhage, or it may be diluted with two or three times as much water and employed as a mouth-wash.

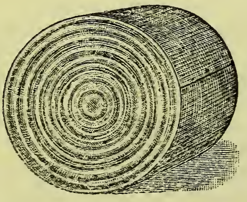
Reduced facsimile

In bottles of 4 fl. oz. and 16 fl. oz.

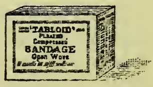
TRADE MARK 'TABLOID' BRAND

PLEATED COMPRESSED DRESSINGS

Pleated Compressed Bandages and Dressings were **originated** and **introduced** by Burroughs Wellcome & Co. They occupy the smallest possible space and yet are unfolded as easily as the more bulky varieties. Each bandage or dressing is of convenient rectangular shape and is enclosed in an effective protective covering.



Graphic representation of the relative bulk of an ordinary bandage, 2½ in. × 6 yds., and a 'Tabloid' Bandage of the same length and width



'Tabloid' Pleated Compressed Gauzes are so packed that any desired quantity can be withdrawn easily without soiling or contaminating the remainder.

The extreme compactness of 'Tabloid' Bandages and Dressings, and the economy in space they effect, enables them easily to be carried in the hand-bag, saddle- or cycle-case. Moreover, their flattened sides allow them, even bulk for bulk, to be packed more closely than the old-fashioned roller-bandage in common use.

The antiseptic dressings are remarkable for the evenness with which they are charged with medicament.

Only materials of the finest quality are used in 'Tabloid' Bandages and Dressings.

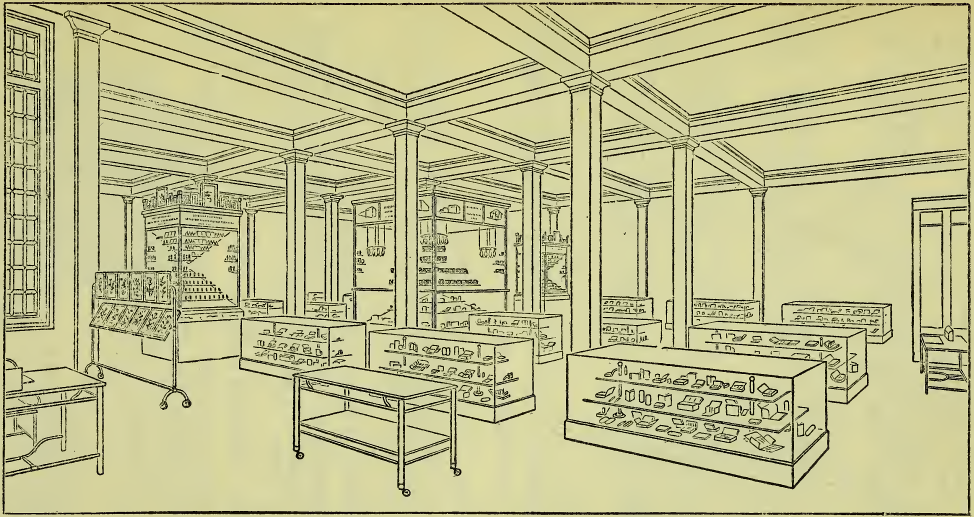
A large variety of dressings is issued under the 'Tabloid' Brand, including the following :—

'TABLOID' BRAND—

- ,, ABSORBENT COTTON BETWEEN GAUZE, PLEATED COMPRESSED. In 2 oz. packets
- ,, COTTON, PLEATED COMPRESSED
  Absorbent, in ¼ oz., 1 oz. and 2 oz. packets; and Boric, Iodoform, Double Cyanide (3 %), in 1 oz. and 2 oz. packets
- ,, GAUZES, PLEATED COMPRESSED
  Absorbent, Bismuth, Boric, Iodoform, Double Cyanide (3 %), and Sal Alembroth (1 %). In packets
- ,, LINT, PLEATED COMPRESSED
  Plain and Boric, in 1 oz. and 2 oz. packets, and Carbolised, in 1 oz. packets

These Dressings are also issued STERILISED

The words 'EPICAINE,' 'EPININE,' 'HAZELINE,' 'LODAL,' 'OPA,' 'SOLOID,' 'TABLOID,' 'VAPOROLE' and 'WELLCOME' are brands which designate fine products issued by Burroughs Wellcome & Co.



RIGHT SECTIONAL VIEW OF B. W. & CO. EXHIBITION ROOM
54, WIGMORE STREET, LONDON, W.

This Exhibition Room is open daily from 9 a.m. to 6 p.m.; Saturdays, 9 a.m. to 1 p.m. B. W. & Co. are here able to demonstrate the scientific aspects of their work without the introduction of any suggestion or obligation to purchase. 'Tabloid' Medical Equipments in great variety may also be seen.

TYPICAL AWARDS

AT INTERNATIONAL EXHIBITIONS

CONFERRED UPON BURROUGHS WELLCOME & CO.
FOR THE SCIENTIFIC EXCELLENCE
OF THE FIRM'S PRODUCTS

MILAN 1906	THREE GRAND PRIZES THREE DIPLOMAS OF HONOUR ONE GOLD MEDAL
LONDON (Franco-British) 1908	SEVEN GRAND PRIZES ONE DIPLOMA OF HONOUR TWO GOLD MEDALS
LONDON (Japan-British) 1910	FIVE GRAND PRIZES ONE GOLD MEDAL
BRUSSELS 1910	EIGHT GRAND PRIZES THREE DIPLOMAS OF HONOUR ONE GOLD MEDAL
BUENOS AIRES 1910	ONE GRAND PRIZE
LONDON (Festival of Empire) 1911	TWO GRAND PRIZES ONE GOLD MEDAL
TURIN 1911	EIGHT GRAND PRIZES TWO DIPLOMAS OF HONOUR THREE GOLD MEDALS

XVII INT CONG MED LOND
GRAND PRIZE

LONDON
(International Congress
of Medicine)
1913
TWO
GRAND PRIZES
The only Highest
Awards for Pharmaceutical and Biological Products

XVII INT CONG MED LOND
GRAND PRIZE

MAKING IN ALL

MORE THAN **260** HIGHEST AWARDS

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THE

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AND
‘Soloid’
} Invented by B. W. & Co.

Are B. W. & Co. **Hall Marks**

They *mark* the work of
Burroughs Wellcome & Co.

They *mean* : “ Issued by
Burroughs Wellcome & Co.”

They *stand* for
24 CARAT products